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CONTENTS.

COMMUNICATIONS AND CASES— Page

Cancer in Herbivora and its relation to "Barsáti." By R. W. Burke, F.R.C.V.S., Army Veterinary Department, Athlone, Ireland . . 63

Improved Mouth-Gag. By Jas. Cooke, F.R.C.V.S., Scarborough (*Illustrated*) 77

Cysts in the Œsophagus of a Dog. By William Littlewood, M.R.C.V.S., Sanitary Administration, Cairo . . 78

PHARMACY AND THERAPEUTICS—

Acid Salicyl Sulphonic . . . 79
Absolute Iodoform . . . . ib.
Chloralamide 80
Salycilic Acid . . . . . ib.
Euphrasia Officinalis 81

PATHOLOGICAL CONTRIBUTIONS—

Pleuro-pneumonia . . . . ib.
Anthrax 82
Swine Fever . . . . . ib.
Rabies . . . . . ib.

LEADERS—

Addition to the Editorial Staff of the *Veterinarian* 83
Parasitism . . . . . ib.

EXTRACTS FROM BRITISH AND FOREIGN JOURNALS—

Address to the Biological Section of the British Association. By Professor J. S. Burdon Sanderson, M.A., M.D., LL.D., F.R.SS.L. & E., President of the Section 85

British Association for the Advancement of Science.—Newcastle-upon-Tyne, 1889. Address by Professor W. H. Flower, C.B., LL.D., F.R.S., F.R.C.S., Pres.Z.S., F.L.S., F.G.S., President (*Concluded*) . . . 91

ROYAL COLLEGE OF VETERINARY SURGEONS—

Quarterly Meeting of Council, held January 9th, 1890 98

EPIDEMIOLOGICAL SOCIETY OF LONDON—

Malaria 108

LINCOLNSHIRE VETERINARY MEDICAL ASSOCIATION—

Meeting held October 31st, 1889 . 109

"Curb," a lecture delivered by Professor Pritchard 110

LANCASHIRE VETERINARY MEDICAL ASSOCIATION—

Quarterly Meeting 118

The Treatment of Wounds," a paper read by Mr. W. Hunting, F.R.C.V.S. 119

[*Continued on* p. 2.

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CONTENTS—*continued.*

	Page
NATIONAL VETERINARY BENEVOLENT AND MUTUAL DEFENCE SOCIETY—	
Financial Statement	130
List of Subscriptions	131
NEW MEMBERS OF THE PROFESSION .	132
ROYAL COLLEGE OF VETERINARY SURGEONS—	
List of Names of Members removed from Register through non-compliance with Section 5, Subsection 4, of the Veterinary Surgeons Act, 1881	134
MISCELLANEA—	
Navicular Disease	136
OBITUARY—	
Mr. John Vick, M.R.C.V.S. . .	ib.

NOTICE.

WILLOWS, FRANCIS AND BUTLER,

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BOOKS, ETC., RECEIVED.

History and Pathology of Vaccination, Vols. I and II, by Edgar M. Crookshank, M.B., Professor of Comparative Pathology and Bacteriology in, and Fellow of, King's College, London, &c.

Agricultural Students' Gazette, December, 1889.

The following foreign publications are to hand:—*Annales de Medecine Vétérinaire*, January, 1890; *Oesterreichische Monatsschrift für Thierheilkunde, und Revue für Thierheilkunde und Thierzucht*, February, 1890; *Archivio per le Scienze Mediche, La Clinica Veterinaria* (Milan), December, 1889; *Giornale Veterinaria Militare*, No. 7; *Zeitschrift für Veterinärkunde mit besonderer Berücksichtigung der Hygiene*, Berlin, January, 1890; and *Journal of the National Agricultural Society of Victoria*, Vol. V, No. 52.

Papers received: *Mark Lane Express, North British Agriculturist, Land and Water, The Field, Live Stock Journal, Bell's Weekly Messenger, Agricultural Gazette, Farmers' Gazette*, Dublin; *Isle of Wight Observer and Chronicle, The Isle of Wight County Press, The Andover Observer, The Gazette*, Montreal; *The Evening Dispatch*, Edinburgh; *Macclesfield County Herald*, and *The Farm, Field, and Fireside.*

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Mr. Burke's note on "Selection of Veterinary Journals" shall appear in our next issue.

To ensure the publication of Cases and Communications in the coming Number they should arrive by the 15th of the Month.

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Communications and Cases.

CANCER IN HERBIVORA AND ITS RELATION TO "BARSÁTI."

By R. W. Burke, F.R.C.V.S., Army Veterinary Department, Athlone, Ireland.

The actual existence of cancer in herbivora has been repeatedly questioned, and although I have no doubt about the existence of such a disease, it is equally certain that many cases which are diagnosed as belonging to that group are really not cases of that disease, where our clinical knowledge has not been brought into accord with the pathological appearances; and there are a number of cases which, examined during certain stages, frequently escape observation, and have therefore not been included in the above group, because we see great variety in the changes which are found in different cases and in different stages in the same case. We have many times had occasion to advocate the examination of a barsáti sore during its several stages where the diagnosis was doubtful, and shall continue to do so. From the differences which cases present as regards the arrangement of the cells and fibrous stroma, and from the different local results they bring about, pathologists have recognised different varieties of cancer. We must at present make use of one term—cancer—to describe all the different varieties of that disease. If we consider cancer as a general disease, we shall have very little difficulty in understanding how it is that in some

cases of that disease we have to do chiefly with epithelial cancer, in others with medullary, scirrhous, cicatricial, or fibroid cancer, and so on. Fibroid cancer may fairly be regarded as the most common variety met with in our animals, and probably the explanation of this fact is the one apparent in the case of all inflammatory disease seen in herbivora; we have simply to do with a preponderance of fibroid development in the latter, which is noted, but in a less degree, in the human patient. This difference in the pathological changes of such cases can be traced to the peculiarity of species, which enables us to explain the extra development of interstitial tissue. It is this fact that explains why it is we get a much smaller amount of mischief following our cases where the whole or greater part of the structures are transformed into fibroid tissue and, as compared with the human patient, comprise so little of the suppurative and ulcerative changes.

The most common unfavorable result of acute barsáti is for the case to become constitutional, where the animal rapidly falls off in condition, and marked nodular affection of the liver, lungs, spleen, and other organs to be found on *vost mortem*. Acute suppurative change is probably a very rare termination of the disease. The most common change to ensue is for the sore to become atrophied on a course of proper treatment, only to appear with renewed activity at repeated intervals, and for the internal organs to present, on *post-mortem* examination, characteristic lesions of the external disease. But in many cases, where the resolution does not take place, the internal viscera are more quickly invaded, as shown by the loss of condition, &c., and the animal has to be destroyed.

Not a few cases of barsáti become, after a shorter or longer time, arrested and retrogressive, and ultimately, to all appearances, cured. These apparent cures are not always permanent, but after intervals of six months, a year, or more, a similar affection is started again, either in the same or in another part, or in both, when it contaminates the internal organs, or becomes again atrophic and is arrested. The tendency of fibroid development in excess of cell formation is one of the most potent agencies in giving respite, and, in some cases, towards arrest and apparent cure of the disease.

A variety of cancer termed *atrophic* cancer has been described in the human subject by many surgeons. It is one form of cancer analogous to the variety met with so commonly by veterinary surgeons, where we have an exces-

sive development of fibroid tissue and marked induration. Various other names have been given to this form of cancer, as, for example, contracting cancer, cicatricial cancer, &c., each of which indicates some prominent feature of the disease. The cells in this form of the disease appear to be very short lived, for they are scarcely formed before they commence to die (Billroth) ; but peripherally the slight cell-infiltration constantly extends, hence complete disappearance of the disease rarely, if ever, takes place.

Indications have not been wanting to show a growing tendency towards the belief in a parasitic origin of the disease. Already numerous parasites have been given the credit of promoting the development of barsáti, and prior and subsequent experience have shown that they do not merit the marvellous properties assigned to them. This hopeful opinion was scarcely endorsed by the observers before there was unanimity of proof, when the facts were more closely examined, that there was no foundation for the belief. Mr. Collins was, I believe, the first to call attention to the fact that barsáti was, perhaps, connected with some parasite, and ever since then there have always been found supporters of the parasitic theory. Messrs. J. H. Steel and F. Smith were for many years its most powerful exponents, and they have clearly described and figured the microscopic appearance of the fungi in question ; but while Mr. Steel supports generally Mr. Smith's view, he gives a totally different description of the fungus ; and Mr. Smith's own descriptions of the parasite and the plates, as given in the *Veterinary Journal* for 1879 and 1884, do not correspond, whilst Mr. Steel has described a third form of parasite (*Veterinary Journal*, 1881). Unfortunately, both these observers have called their parasites diagnostic, which has been a great stumbling block for beginners. I should remark in passing, that parasites met with in external sores should never be classified among specific ones until their relation to the disease is more fully recognised, otherwise mistakes will arise. It is not enough to show that a large number of parasites found in a sore exposed to the external air have necessarily occasioned those sores. If the theory were correct (*a*) the disease should be found to depend upon one specific organism ; and (*b*) it must be capable of production by the organism both before and after repeated pure cultivation. I am not aware that any experimenter has produced the barsáti lesions from a pure cultivation. Indeed, cultivation has never been attempted, and numerous inoculation experiments carried on by us as well as

other veterinary surgeons have shown that the disease cannot be transmitted and is not contagious. How, then, can it be claimed that barsáti is in any sense a parasitical disease? So many parasites exist in all local sores that we should be sorry to find the stigma cast upon non-pathogenic fungi* regarded as a satisfactory solution of the pathology of barsáti, still less as a reason for taking no measures to study its many clinical peculiarities, &c.

Then, as to negative evidence against the parasitic hypothesis, it is almost overwhelming. Many competent observers in England, among them Dr. George Thin, of London, Professor D. J. Hamilton, of Edinburgh, and others, to whom specimens were submitted for examination, have searched, but searched in vain, for a microscopic fungus. Those who hold the parasitic theory of the origin of this disease must place it in the same category with other affections due to epiphytic intrusion, and must therefore believe it to be capable of spreading by contact. Clinical evidence points decidedly to the contrary belief. I have witnessed no case of bursáti in which any proof was shown that the disease was caught from another affected horse. I have seen individual cases, in large Government studs in India, presenting typical illustrations of the disorder in every stage, which have never transferred the disease to other horses.

The main interest in the above facts lies in the illustration it affords of the similarity shown between this disease and cancer as witnessed in man. This view of its causation corresponds exactly to the parasitic theory of cancer advanced by many medical practitioners, though recent experiments in Berlin have confirmed the observation that it is impossible, by the methods at present employed, to cultivate any sort of organism from cancerous sores; and the number of cases recorded of cancer propagated by contact is so small that it is almost coincidental. If we are to assume that a fungus, microbe, or a bacterium is the cause of the disease, the question would still arise, Is there or is there not any other feature peculiar to the disease apart from the history of micro-organisms? I am convinced that the advantages which have been gained through the aid of surgery and the use of the microscope in some forms of this disease and in certain stages, since our first acquaintance with it, are very great. I need only refer to the record of its many clinical features given to us by army veterinary surgeons of the past thirty

* See Drs. T. R. Lewis and D. D. Cunningham's "Report on Oriental Sore, Delhi Boil, or Lupus Endemicus," 1876, *Brit. Med. Journ.*, 18th July, 1885, &c.

odd years, by which very much may be learned. In the rich field afforded by such a mass of practical information as this, recorded by men of acknowledged competence, in mutual co-operation, important and trustworthy results might be attained. A very wide field of inquiry is still open in this direction. If we limit our share of pathology to a discussion on the presence or absence of parasites, my experience would lead me to say that there can be no doubt that barsáti must be classed with diseases having no acknowledged place in science; and so we may grope on for many years to come in utter darkness without any advance. I need only refer to the anti-parasitic treatment, and what it promised to do for our cases. My experience bears out that of many others—that anti-parasitics applied to a barsáti sore does not in the least check the course of the disease.

It is quite evident that our inquiry must be extended and enlarged, if progress is to be expected in our knowledge of the disease. Professor McFadyean has lately proposed that nearly all our knowledge of the disease should be founded on the study of its structural characters; but what we want to know is the reason why it has such peculiarities, in what relation it stands to the normal organism, and how it is that it runs its peculiarly destructive course (*Veterinary Journal*, November, 1889).

Among the standpoints from which the disease may be studied, that of its microscopical features is not the least uninteresting. I believe I have given a representation of the compressed mass of cells, together with the stroma found in local sores, as well as some naked-eye appearances of the changes set up in internal organs, which appeared in my articles on barsáti in the *Veterinary Journal* some years ago. Without taking up space by critically examining into and stating particularly the advantages offered by a microscopic study of the nature of cancer, as recorded more recently, I may only notice one of the last. I allude to the Morton Lecture on Cancer by Dr. John Marshall, F.R.S., published in the *Lancet* of November 23rd, 1889. Now there would appear to have been very widely different opinions among the earliest pathologists on the cells and stroma constituting cancer structure—their relation one to another and to cancer. It has been held by most writers, says Dr. Marshall, that the stroma is a mere web that holds the cancer-cells, that it is produced by the irritation of those cells, and that by degrees it may consolidate itself into such a hard firm form as to crush the very cells under the influence and agency of which it has been developed. If the cancer-cells

secrete a substance in superabundance, which induces the formation of the stroma, it may also serve to dissever the element of the cells themselves, and help to carry them on into the lymphatic spaces, as they are called, and so into the lymphatics, and onward to distant parts.

The notion of special cancer-cells, distinguishable by morphological characters alone, has had to yield before the discoveries of a profounder histology. We know that the important part of the cell, according to modern physiological notions, is the so-called nucleus. The nucleus governs, as far as we can understand it, the evolution of the cell, as well as its multiplication. And Dr. Marshall points to nuclear changes in the cancer-cells, which gives them properties different from the normal, whence they are derived. He further points to the metabolic processes of cell-life, and suggests that the cells of cancer may produce material which may extend to surrounding tissues and distant organs. Drs. Heneage Gibbes and Lauder Brunton have also taken up this interesting work of studying the *modus operandi* of the nucleus of a cancer-cell by using various tests of colouring agents to discriminate the different changes seen in the cancer-cell.

The above very practical suggestions are added to by a leader in the *Lancet* of November 30th, 1889, which concludes that all older theories made to account for perversions in tissue formation which constitute the atypical structure of cancer should be abandoned, because "facts all seem to point in one direction—namely, that of a localised aberration in cell growth." Leaving all older problems, at present wholly speculative, to be suffered to wait until more is known about the nature of the cancer growth itself, the *Lancet* lays great stress upon a striking feature of the cell-development in cancer, viz. its disorderly, or, as Dr. Marshall phrases it, *anarchic* growth. The cells multiply profusely, so that they accumulate and *perish from mutual compression;* but why they so multiply, why they are so atypical, is quite unknown. The *Lancet* says:—"In proportion as the cell-elements dwindle in amount so does the stroma increase, *and the more 'atrophic' the cancer and slower its growth, the denser its tissue and more contracted its alveoli.* Certainly the stroma should not be neglected, even if it be of minor importance. It is quite true that, beyond serving as a diagnostic basis, this stroma has received but little attention at the hands of histologists."

Next, as to the formation of peculiar small bodies known as *kanker* from their resemblance to a stone of that name.

I do not say that they occur in every case of barsáti, any more than they are to be found in every case of cancer witnessed in man; but the structure of epithelial cancer, where some of the cells are arranged concentrically, forming the well-known "birds' nests" or "epidermal globes," shows a likeness in that direction. Histologically these kanker nodules differ in no respect from similar nodules found in human cancer. Billroth, of Vienna, in describing one form of cancer he has specially studied, says, in respect to these concretions, that "when they are numerous and well characterised they are diagnostic." In some places they produce characteristic "lumps" in the substance of organs, but particularly in that of the lungs. Caseation of these nodules now and then takes place as a result of complicity with other products, and from insufficient nutriment. It is commoner, as experience shows, to meet with the grey formations, and those which have undergone that physical variation by transformation into a horny mass, called cornification, or by infiltration with inorganic salts into "womb-stones" or kanker.

Those who have examined a kanker nodule during its various stages of development know that, in addition to containing cellular elements, it is made up of an abundant intercellular substance or fibrous stroma which is impregnated with earthy salts, depending on the stage of development during which the kanker is subjected to examination. Inspecting Veterinary Surgeon Meyrick records having noted the presence of crystals of uric acid and oxalate of lime, and various other crystals have been described by different writers. And this leads me to say that chemistry will herein aid us, because long ago it was pointed out that cretification is one of the conditions apt to follow upon the growth of cancer, and the cretification or hardness of the stroma is accompanied by a deposit of lime salts; so that here we find hardness and crispness and a likening to periosteal growth, associated with the presence of lime. Some years ago I had a special analysis made in Edinburgh of this peculiar tissue (kanker), and the result was that its ash contained a very large proportion of phosphates, which I published in a back number of the *Veterinary Journal*. Now there was nothing remarkable in that, because the fact had been demonstrated by the microscope and shown by Dr. Hughes Bennett and others, many years ago, in beautiful illustrations of this transformation of cancer tissue into a kind of calcified substance; and Veterinary Surgeon Western has maintained that the kanker

nodules found in barsáti were so many centres of independent osseous development. He was doubtless led to believe this because of the fact that they were hard to the feel, brittle, and chipping when struck by metal—properties that very naturally engage the primary attention of physicists. We know that osseous change may and does take place during certain morbid developments, but we cannot say we have found it do so in kanker in the examinations we have made of it; while the brittleness and hardness are demonstrably due to chemical changes occurring in it during the progressive stages of development. I think, however, that we may learn a great deal by a more patient and thorough investigation of the structure, the mode of formation, and the chemical composition of these growths.

The history of barsáti seems to me to be interesting, not only on account of the paucity of literature on the subject, but as illustrating the numerous points of resemblance between it and the type of human cancer, which has received so little attention from veterinarians in the past. There is a tendency to disbelieve in the existence of such a disease as cancer in the horse, because of the lesser fatality characterising the course of the latter disease in this animal. The resemblance to the disease in a case of true barsáti is sufficiently striking to suggest affinity in point of general characters. At the same time it is worthy of remark that this lesser fatality accompanying the course of barsáti is common to nearly all the malignant growths* seen in herbivora, *e. g.* melanotic sarcoma, etc., of which no explanation has been given in the past. M. Leblanc is the first veterinary authority who has made any definite statement in regard to the lesser degree of malignancy characterising the course of cancerous sores seen in herbivora. The difference between man and the lower animals imparts to the tissues the alterations in their molecular disposition to the disease, which explains the difference in the virulence of the disease in these patients; besides which, silica is one of the substances which is found in the body, especially in the case of vegetable feeders, and silica and other salts assist in reducing the death-rate from cancer even in man. Sufficient attention has not hitherto been given to the question of food-supply as influencing the course of barsáti, which is capable of being greatly developed. The preventive value of starch so far as it affects the course of human cancer, has been to a great extent recognised, but no special mea-

* "Malignant Tumours," in 'Veterinary Surgical Pathology (in Urdu),' by J. and R. W. Burke, 1886, pp. 168 to 253.

sures have been undertaken to develope its significance, especially in the case of vegetable feeders.

If we now direct our attention to the clinical aspect of the question, we are at once met with a number of facts recorded by different observers of which no explanation has been attempted. It is further necessary to observe that not every case of sore which runs a chronic course, is to be classed as true barsáti. There are many cases of simple sores, which may be aggravated by the conditions of climate in India. We cannot escape from the conclusion that many cases of sores which have been described as barsátic, were not barsáti. Further, true barsáti is a rare disease in India, as compared with the many indolent sores which are often described under that name. Our difficulty is to know how to distinguish between such cases.* I have just a little to say on a subject-matter with which I have been connected now many years. I thought that, before a proper diagnosis could be arrived at, a close study of the clinical history of the disease was necessary; but I find that in many places there are discussions about the presence of parasites in barsáti sores, without ascertaining what the barsáti sores are like. Numerous difficulties will present themselves to the beginner, but the chief one will be that of mistaking other sores for barsáti, and having different aspects of the disease presented during its different stages. In some cases a large tract of tissue is rapidly involved; or the disease is a slow and chronic one, the primary focus remaining limited to an external sore for several months, and extending only slowly. Between these two extremes we meet with great variety as regards the structural lesions presented. The microscopical changes in such cases consist of equally marked differences. The amount of fibrous tissue or stroma present, in proportion to the cellular elements, especially varies in different cases—the more chronic the cases the more fibrous tissue being found as a rule.

I think we might gain much information regarding the disease by studying a few of its clinical peculiarities, which I may thus summarise in reference to what I have observed:

1. The general experience of veterinary surgeons in India shows that barsáti sores which, under appropriate treatment, generally subside about the end of September, redevelop their activity next March or April, *i. e.* within six to seven months. Dr. Cooke writes† :—"We have had the oppor-

* See chapter on "Diagnosis of Barsáti," in my 'Tropical Diseases of the Horse,' 2nd edition, 1888.

† 'On Cancer: its Allies and Counterfeits,' p. 92.

tunity of seeing at the Cancer Hospital 413 persons who have been operated on for cancer, and it will astonish the reader to be told that the average lapse of time before the disease returned in these cases was not more than *six and a half months.*"

2. The points of junction of skin with mucous membrane, as well as parts exposed to friction, are most frequent sites of barsáti ulceration. Hence the favourite seats of barsáti are seen to be the angles of the mouth and the lips, which are liable to irritation by the bit, &c.; the inner aspect of the fetlocks, more especially in horses given to habitual "brushing"; the prepuce; the lachrymal region, &c.

3. A fact of importance in the clinical history of barsáti is absence of inflammation characterising the sores. Inspecting Veterinary Surgeon Meyrick, in a lecture delivered at the Aldershot Military Veterinary School in 1881, said that barsáti was non-inflammatory in its character; and Dr. Mitchell ('Treatise on Cancer,' p. 84) says that "the absence of inflammation throughout the entire course of the disease is the general rule, though inflammation may and occasionally does occur during its progress, but then as an exception only."

4. Another important feature of barsáti is the presence in the sores of pain or irritation felt at different intervals. Veterinary Surgeon Spooner Hart (*Veterinarian*, 1873) writes, what must be the experience of everyone, that "barsáti sites, though healed, are liable at any time to become irritable, and to be gnawed by the horse, this act showing beyond dispute that some irritative action is going on."

5. Writers on cancer lay great stress on "induration of the sore," as specially distinguishing cancer in man—a fact emphasised by those who have seen anything of this disease in the lower animals. Thus Professor Walley,* speaking on cancer of muscle in the horse, says:—"In all cases the involved parts are extremely *tumefied and indurated*, and are the seat of *periodical softening* and formation of abscess with external eruption; and, notwithstanding the nature of the disease, animals have been in work constantly since it was first observed." Inspecting Veterinary Surgeon Oliphant,† in his article on barsáti, observes: "From rubbing or biting—for the sore is particularly itchy—the crown of the ulcer becomes violently detached, leaving a moist, irritable sore, the base of which speedily becomes indurated." Mr. Hart

* *Journ. Comp. Pathol. and Therapeutics*, September, 1889.

† *Veterinary Journal*, July, 1880.

also describes "an indurated base extending to a depth of half an inch or an inch."

6. Mr. Hart says: "Simple sores and galls, if neglected, are very apt to assume barsátic action," which is the general experience of veterinary surgeons in India. Most authors who have written on cancer state that simple wounds and ulcers sometimes become the seat of cancerous disease, and that the epithelial form of cancer does frequently arise in the chronic ulcers themselves.

7. Another question which has been raised is as to the condition of animals previous to the appearance of barsáti, and the general answer is—remarkably healthy. Mr. Smith (*Veterinary Journal*, 1881) characterises the condition of horses subject to barsáti as "vigorous." And the experience of surgeons regarding cancer is that "prior to and for a long time after the appearance of a cancerous sore the constitution is distinguished, in most cases, by its remarkably healthy characters, and by the absence of any appearances which would indicate disease" (Mitchell, 'Treatise on Cancer').

8. Mr. Hart writes: "After an *indefinite* period of immunity the disease reappears." We know the history of several cases in which the disease recurred after a cessation of three years, and in one case after a period of four years; whilst Hutchinson, Professors Billroth, Buchanna, and Dr. Whitehead give instances of immunity after operation and other modes of treatment to three, five, and fifteen years in the case of man.* And many similar cases of immunity might be mentioned.

There is one point in the history of barsáti which has not received the attention of observers which it probably deserves. This is the history of apparent cures. Most commonly we find an atrophic change sets in during the course of barsáti, and the case is discharged as cured, when in many cases the disease has in reality not been cured, but barsáti which has been temporarily arrested. Another danger which is present in these cases of healed barsáti is the risk of wide constitutional disease ensuing in consequence of absorption from the locus focus. Not infrequently such internal disease has been an obscure one, or it has passed for a time into a quiescent condition. This is due to the formation of fibrous tissue, which has been repeatedly pointed out by pathologists to be regarded as a conservative change, and one showing the tendency of the process to become quiescent. At the same time the great majority of cases, which to the naked eye appear quiescent and would be placed among the

* *Med. Times and Gazette*, 7th March, 1874, p. 256.

cases of healed barsáti, soon show signs of activity, and often develop into the most acute forms of the disease. I need not lay any stress on this quiescence peculiar to barsáti; for I think many pathologists will admit* that the more abundant the fibrous change and the calcareous deposit (kanker formation) found in these cases of quiescent barsáti, the less must be the risk to the animal of a general development of the disease.

9. We have observed that during the rains a barsáti sore generally becomes greatly aggravated, and does not heal up under ordinary dressings. We recognise that wet weather favours the growth and increases the malignancy of a barsáti sore, but we know that the progress of a simple sore is influenced in like manner during such weather. The opinion I ventured to express is that this disturbing factor is dampness of the air, causing tissue metamorphosis and interference with the reparative process. Excess of moisture present in the air makes the protoplasm of the cell-elements swell up, and ultimately become disintegrated. If this be so, we may infer that where the influence of the healing process in simple wounds is upset by the local causes, structural changes in a barsáti sore may be presumed to follow, on the principle that the growth of an organic disease is similarly promoted by exposure to an atmosphere of opposed conditions. Thus it will be seen that, so far as influence of season is concerned, aggravation of a barsáti sore in the rains may be viewed as a result of moisture that has led to very appreciable structural or organic alteration; for "the malignancy of epithelioma is greatly influenced by physical conditions, being more pronounced in proportion to the *moisture*, vascularity, and amount of movement in the part" (Jones and Sieveking's 'Pathological Anatomy,' 2nd ed., p. 180).

10. Inspecting Veterinary Surgeon Oliphant, alluding to the subject of operation in his paper on barsáti, says: "The state of the system existing in barsáti is not one that indicates the use of the knife." And Sir Benjamin Brodie, in a recent lecture upon operation for cancer in the human subject, said: "If you are doubting about the expediency of an operation, and the disease be in an indolent state, the recollection of such cases as these, where the patient has lived with scirrhus of the breast unaltered for many years, should be sufficient to incline you to reject it. An operation not only never succeeds, but it rather hastens the progress of the disease."

* "The Atrophic Process affecting Growth of Cancer," in Payne's 'Manual of General Pathology,' 1888, p. 315.

11. Mr. Oliphant, describing the nature of *kanker* in internal organs met with in the course of barsáti, observes: "It appears to consist of animal matter containing deposits of salts; when fresh it cuts like cartilage, and when dried is distinctly gritty. In all these points it is very like tubercle, but I have failed, so far, to trace in it one peculiarity of that disease product—*softening*." And all medical evidence shows that there is never any acute softening in any part of the body in cases of cancer. So far back as 1870, the *British Medical Journal* pointed out that it was the presence of inflammation in tubercle and its absence in cancer which indicates the great distinction between these two diseases.

12. Amongst other striking points in this connection, there is also the fact that the distribution of barsáti in point of stations varies, there being a comparative infrequency, if not total absence, noticed in most hilly and limestone districts of India; and this infrequency of the disease in certain soils has been noted now by several observers, among them also American practitioners who have had an opportunity of witnessing one form of this disease in America. On the other hand, we have similar evidence given us regarding the prevalence of cancer in man in certain districts and its absence in others, noted by Dr. Haviland in his lecture which was published in the *Lancet* quite recently (1889).

13. Finally, with regard to recurrence in barsáti. We can offer no better explanation than by saying that there is perhaps no feature more characteristic of cancer than its tendency to recurrence. Dr. Campbell de Morgan, F.R.S., writes*:—"A remarkable and not very explicable phenomenon is the arrest of cancer growth and the gradual wasting of the diseased mass. The activity of the whole mass is arrested, new cells cease to be formed, and the tumour fades—a widely spread mass becoming quiescent and then fading throughout its whole extent. It shifts the difficulty back a stage or two to suggest that the recession of cancer takes place in obedience to the law under which local atrophy, independent of inflammation or disease, may occur; or that it may be due to some want of organising power inherent in it from the first, as some cancers seem born to be atrophic." Herein, it seems to me, we have the whole explanation of barsáti, expressed in a few words. It is, under any circumstances, a most important subject for investigation.

* *Med. Times and Gazette*, 7th March, 1874, p. 256.

The reduced mortality from cancer in the lower animals seems to me to indicate that it is due to some difference in the constitution of the latter as compared with human beings, especially as influenced by the different modes of living, &c. Such facts, I need not say, are by no means confined to the history of cancer alone; for it is clear that this is true of nearly all the malignant growths seen in herbivora.

There is one important group of diseases requiring careful inquiry in veterinary pathology, namely, malignant growths. To study such conditions as cancer, sarcoma, &c., as they occur in animals, and compare them with corresponding diseases in man, and then demonstrate the identity by close observation, is the highest class of work in pathology, and the work of the future. Indeed, the careful observations of the comparative pathologist have shown up diseases of animals as a new and attractive field of research. Able authorities have repeatedly shown that the lower animal was liable to suffer from *every form of malignant growth seen in man.* The essential object of future investigators is to determine the importance of a comparative study of this disease in all its phases. With increased experience, this line of inquiry will doubtless be encouraged.

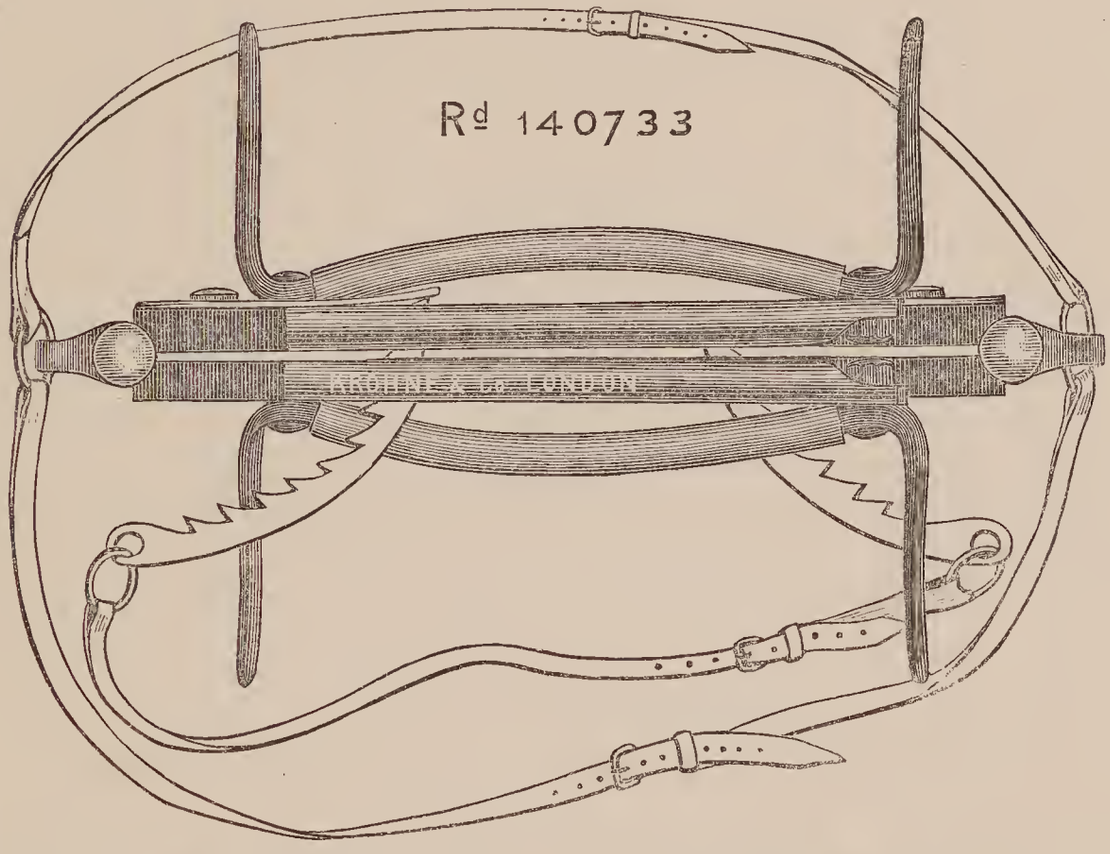
The questions at issue are so vast and far-reaching that each principal phase must be studied separately; and it is only natural we should first investigate that portion of the subject which, as causing the greatest danger of misunderstanding to the beginner, is consequently the most urgent. We allude to the small basis of clinical knowledge which, strange to say, is still tolerated in our midst. There is a vague feeling prevailing among some that almost any sore which is long in healing is to be called barsáti. This depends in a great measure on the want of experience and attention to the first principles of studying disease.

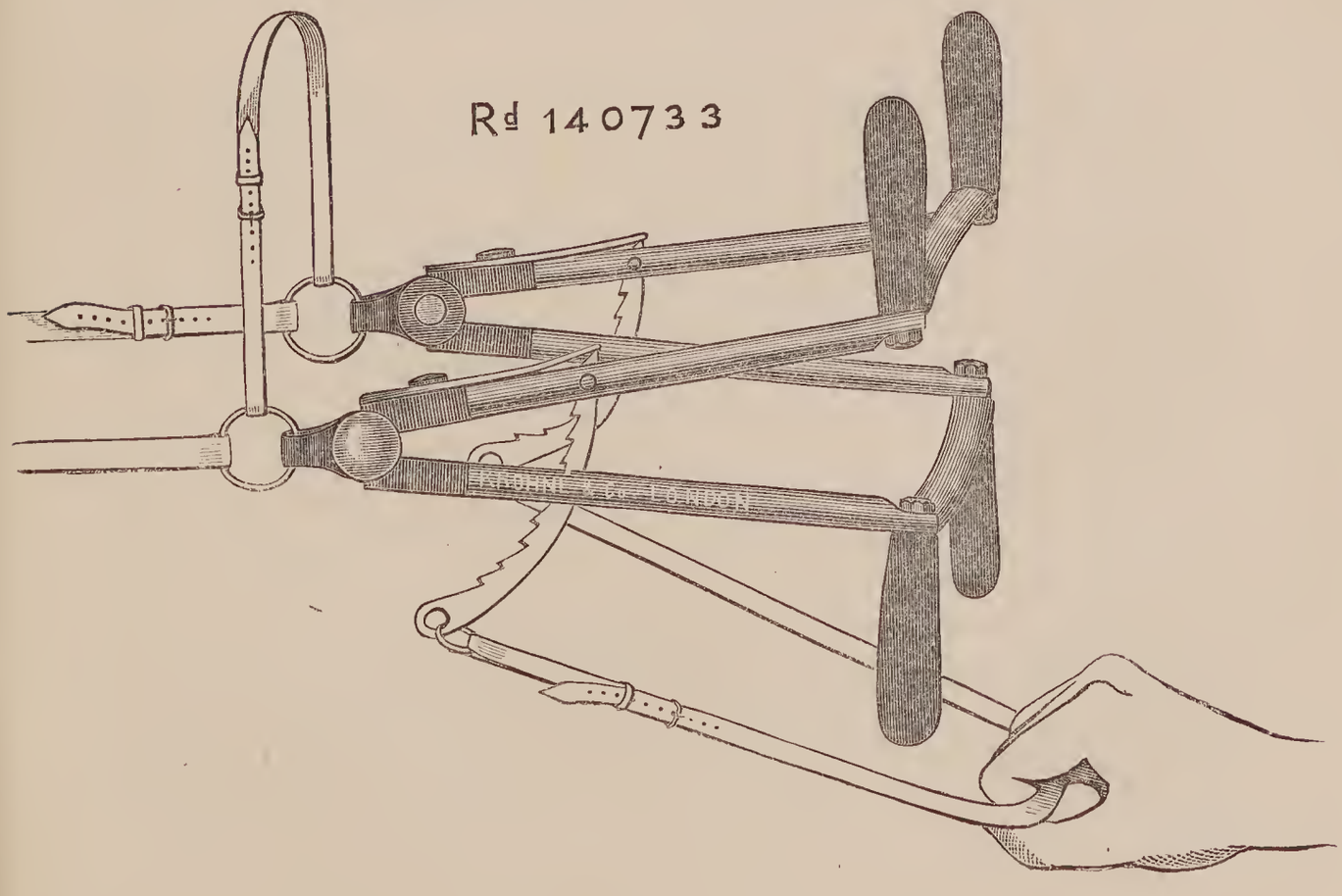
We look forward for a large solution of many important questions connected with the disease, and this can only be expected as the result of the utmost patience and earnest work, because its scope is extremely wide, and includes, so far as its study is concerned, the consideration of the subject as a whole, which must embrace its component as well as its divergent parts.

IMPROVED MOUTH-GAG.

By James Cooke, F.R.C.V.S., Scarborough.

The annexed illustrations represent a mouth-gag, open and folded, which I beg to introduce to the veterinary pro-





fession. It was made at my suggestion by Messrs. Krohne and Seseman, London. Having used one of a similar construction for some time I can speak of its advantages over other gags or balling irons. I have no doubt that its simplicity in structure, easy adjustment and portability, will be greatly in favour of it coming into general use. To fix it in position the india-rubber bars are to be placed in the animal's mouth, in a similar way to an ordinary bit, and the head-strap passed behind the ears and buckled. The gag is then opened by pulling the india-rubber bars apart; the distance can be gauged, and the mouth-piece retained in position by the spring ratchet. The mouth can be closed instantaneously by simply pulling the small strap attached to the ratchet. This gag obviates the risk of injury to the operator's hand; it cannot slip sideways as is sometimes the case with hand gags when the animal shakes its head or the assistant loses his hold. There are no pillars or supports to impede the hand of the operator, which I believe are to be found in all other mouth-gags. It is very light and portable; being jointed it can be folded into a small compass and carried in the coat pocket or saddle case.

CYSTS IN THE ŒSOPHAGUS OF A DOG.

By William Littlewood, M.R.C.V S., Sanitary Administration, Cairo.

A white fox-terrier bitch (owned by an English officer in the Egyptian police) was observed in the streets of Cairo foaming at its mouth; as it was thought to be mad, it was sent to me for an opinion. The owner stated that the bitch had three weeks since some similar symptoms, but that it made no attempt to escape from the house or injure anyone. From time to time the dog vomited and was at my request left with me for treatment. Until the day it was destroyed it had a good appetite, but daily became thinner, and vomition was more frequent. Heart's action was irregular, intermittent, and the animal staggered when walking.

Post-mortem examination showed the *heart* to be considerably distended, the walls thin and flaccid. *Lungs.*—Slight patch of pneumonia. *Œsophagus.*—In the portion of the œsophagus passing over the lungs two large cysts were present—one the size of a pigeon's egg, the other a

little smaller; these cysts were completely filled with parasites, the *Spiroptera sanguinilata;* the œsophagus was not in any way constricted. *Stomach* slightly congested and filled with food.

Pharmacy and Therapeutics.

ACID SALICYL SULPHONIC.

Salicyl sulphonic acid is highly recommended by Herr Roch (*Pharm. Centralh.*, September 19th, p. 549) as a reliable, delicate, and convenient test for albumen in urine. When the acid is added the albumen is thrown down as a white powder, having an acid reaction and giving with ferric chloride an intense red colour. In testing urine for albumen, Herr Roch recommends a few crystals of the salicyl sulphonic acid into a cubic centimetre of the urine, and shake, when the occurrence of turbidity may be taken as evidence of the presence of albumen since the reaction is not affected by the presence of urea, uric acid peptones, or glucose.

ABSOLUTE IODOFORM.

Reference was made in these columns (May, 1889, p. 330) to a new process for the manufacture of iodoform, based on an article in the *Pharm. Journ. and Trans.*, March 2nd, p. 704, where it was shown that the iodoform was prepared direct from the ley of the kelp industry, based on the reaction between acetone and nascent alkaline hypoidite, produced by the action of hypochlorite on the alkaline iodide in the liquor. In the *Repertoire*, November 10th, p. 481, it is now shown that this process is being carried out on the manufacturing scale near Rouen, and it is proved that the iodoform produced is absolutely pure. It is described as occurring in micaceous scales of a fine pale yellow colour, soluble without residue in alcohol, ether, chloroform, and carbon bisulphide, and having only a feeble odour. This difference in odour from iodoform prepared in the old method is explained by the fact that the reaction in the new process takes place in dilute solution in

the cold, without the production of free iodine, whilst in the usual process the reaction between free iodine and boiling alcohol gives rise to the formation of hydriodic acid and secondary compounds, to the presence of which in traces the stronger odour is due. This new process will be a great achievement in pharmacy and surgery, as the very powerful smell of the drug, so objectionable to many, will to a great extent be got rid of.

CHLORALAMIDE.

The new hypnotic *chloralamide* is causing some interest to therapeutists, and is having an extensive trial in hospital and private practice. It forms the subject of an interesting communication from Dr. Paterson, of Cardiff, in the *Lancet* for October 26th, p. 849, wherein he shows that he tried the drug in fourteen cases of insomnia, including simple sleeplessness, and that consequent upon phthisis, heart disease, and enteric fever, and the results derived were upon the whole satisfactory; for although the action of the chloralamide is not quite so rapid in its action as that of chloral hydrate, sleep coming on from half an hour after its administration, this is considered to be more than compensated for by the almost entire absence of action upon the circulation. The chloralamide, however, appears to be not quite free from some of the disadvantages attending the use of others, since in some instances doses of 30 grains and 45 grains were followed by giddiness, feeling of sickness, dryness of mouth, and even slight delirium. As a rule, sleep lasting about eight hours followed its administration, and in cases of phthisis its influence in restraining sweating was very marked; but the insomnia and restlessness due to pain were little, if at all, affected by it. Dr. Paterson thinks some of the published doses to be too much, at least to begin with, especially if the patient has been ill some time. He has found that usually from 30 to 45 grains is sufficient for a man, while 20 to 30 grains will prove sufficient for a woman.

SALICYLIC ACID.

Dr. S. W. Hope, writing in the *Brit. Med. Journ.*, November 16th, p. 1092, strongly recommends salicylic acid in the treatment of coryza or colds in the head. He asserts that if it be applied to the irritated lining membrane of the nose when sneezing manifests itself, and before any

inflammatory action is established, a single application will be found sufficient to abort a cold. The formula that he gives is as follows:

℞ Sodii Salicylatis, ʒiv;
Boracis Pulv., ʒj;
Cocaine Hydrochlor., gr. xxij.

Mix by agitation, not in a mortar. This compound would be found serviceable for blowing into the nostrils of horses suffering from simple nasal discharges, and could be used by Allman's nasal insufflator.

EUPHRASIA OFFICINALIS.

The common "eye bright" *Euphrasia officinalis* is another new remedy recommended in the treatment of coryza by Dr. G. M. Garland (*Boston Med. Surg. Journ.*, November 7th, p. 453). Dr. Garland states that he used the drug in the form of a tincture, which he gave in ten-drop doses in water, and he found it to exert a powerful action upon the recently inflamed mucous membrane of the nose and pharynx, reducing the secretion in a very short time. He also found it to be of great service in the acute attacks of coryza of infants. The drug may be tried in the treatment of coryza of horses with some good results. The dose of the tincture would be about 1 to 2 drachms in water.

Pathological Contributions.

PLEURO-PNEUMONIA.

In Great Britain, during the five weeks from December 14th, 1889, to January 18th, 1890, there were 33 outbreaks of pleuro-pneumonia reported, 22 in England and 11 in Scotland; 142 cattle were attacked, 89 of which were in England.

The counties in which the outbreaks occurred have been Cumberland, Hants, Kent, Lancaster, London, Norfolk, Notts, Edinburgh, Forfar, Lanark, Perth, and Stirling.

In Ireland 6 fresh outbreaks were reported and 11 cattle attacked. These were all within the county of Dublin.

ANTHRAX.

There were 17 fresh outbreaks of this disease reported in Great Britain, and 25 animals were attacked, of which 24 died and 1 was killed. The counties in which these cases of anthrax occurred were Chester, Durham, Lancaster, Norfolk, Somerset, Worcester, Banff, and Stirling.

In Ireland only 1 outbreak of anthrax was reported in the five weeks; this occurred in the County of Wexford—6 animals were attacked and died.

SWINE-FEVER.

In Great Britain 280 outbreaks of swine-fever were reported, 1757 swine were attacked, 792 diseased pigs were killed, 748 died, 240 recovered, and 242 remained alive when the last published returns were made up. In Ireland 23 outbreaks were reported and 58 swine attacked.

RABIES.

In England 21 cases of this disease were reported in the counties of Chester, Hants, Lancaster, Leicester, London, Middlesex, Surrey, and York (West Riding). In Ireland 17 cases of rabies were returned in the five weeks.

THE VETERINARIAN, FEBRUARY 1, 1890.

Ne quid falsi dicere audeat, ne quid veri non audeat.—CICERO.

ADDITION TO THE EDITORIAL STAFF OF THE *VETERINARIAN*.

OUR subscribers will observe with satisfaction the addition of the name of the Principal of the Glasgow Veterinary College to the editorial staff. Professor James McCall is too well known to need any introduction from us, but we may venture to suggest that his co-operation will be a link to connect us with the members of the profession over the Border. Looking back to the time when we, with two colleagues whose names are still fresh in all our memories, undertook the duties of the editorial chair, we recollect that there was no other journal in this country exclusively devoted to the literature of veterinary science. Times have changed, and there are others engaged in the same field of labour. We can claim, however, that the same spirit which moved us then actuates us, and, we doubt not, our fellow-workers now. We have, all of us, to deplore that the members of the profession are sparing of their contributions. Pressure of daily work, we may hope, is the cause of their reticence ; but we may remind them that many an interesting and valuable case lies buried in the notes which might be useful and instructive to others ; and in the present day there is no lack of channels through which ideas may be interchanged.

PARASITISM.

PROFESSOR HARPER, of the Royal Agricultural College, Cirencester, delivered at the Royal Veterinary College, January 23rd and 24th, two lectures on Parasitism which must have indicated to the large class who listened to his remarks that there is something more in the question than is involved in a consideration of the effects of worms in the

organism of the higher animals, and the remedies most effectual in counteracting them.

In defining a parasite the lecturer took exception to the use of the word in its strict sense as meaning an organism which lived on the tissues of a higher organism, because he proposed to show that some parasites did not harm the being on or in which they reside, while often they might be helpful. He therefore substituted a definition more comprehensive, and referred to parasitism as the association of two living beings, one of which played the part of host, and the other that of guest.

Forms of parasitism were sketched, *i. e.* commensalism, mutualism, inquilinism, and symbiosis phases which, as the speaker observed, placed the whole subject of parasitic life in a new light. For example, in commensalism the remora was instanced as simply adhering to the shark without doing it any injury, only using its leviathan host as a conveyance, and sharing its meal as a dog might pick up the crumbs from beneath the table.

Some ecto-parasites merely live in the débris of the skin, and thus benefit the host. This form of mutualism is exhibited by the trichodectes of horses and cattle.

When two larval forms live in the same host, both feeding in the same tissue, the term inquilinism, suggesting lodgers, is applicable ; and in symbiosis the parasite, while it lives on the effete products of its host, *i. e.* carbonic acid, yields in return oxygen and organic aliment to the tissues in which it resides.

Perhaps the most interesting part of the Professor's argument was that which related to the gradual degradation of the organism enjoying a free life, to the slavish existence of the parasite as the result of an occasional indulgence in the parasitic habit to begin with, followed by the slow development of the tendency to live in the tissues of the higher organism, till finally all attempt at independence of life was abandoned and the once free being became a mere pendant to another and a stronger life.

Extracts from British and Foreign Journals.

ADDRESS TO THE BIOLOGICAL SECTION OF THE BRITISH ASSOCIATION.

By Prof. J. S. Burdon Sanderson, M.A., M.D., LL.D., F.R.SS.L. & E., President of the Section.

It has long ceased to be possible in the course of an annual address in Section D to give an account even of the most important advances which have been made during the preceding twelve months, in the various branches of knowledge which are now included under the term Biology. One reason is that each of the biological subjects has acquired such vast dimensions. The other, that the two main branches —Morphology, which strives to explain why plants and animals have assumed the forms and structure which they possess, and Physiology, which seeks to understand how the living organism works, have now diverged from each other so widely as regards subject and method, that there seems to be danger of complete separation of the one from the other.

From this sundering of sciences, which a generation ago were intimately united, however inevitable it may be, Physiology chiefly suffers, as being even to the naturalist less attractive and interesting. The study of form and structure has the great advantage that it brings the observer into direct relation with objects which excite his curiosity without requiring too great an effort to understand them. This was the case even when Anatomy was mainly descriptive, and Zoology and Botany occupied themselves chiefly with classification and with definition of species. How much more is it the case now that Anatomy, Zoology, and Botany have become built into one system of which the doctrine of evolution is the corner stone. Morphology, the name now given to this system, has, if I am not mistaken, this advantage over all other subjects of scientific study—that while attractive to the beginner, it is perfectly satisfactory to the mature student. It derives its perfectness from its subject—the order of the plant and animal world. For inasmuch as its fundamental conception is the development of all organisms, however complicated, from elementary forms, and as the ideal development of the plant and animal world (in other words, the science of morphology) claims to be nothing more than a synthesis of the observed facts of actual development, the science is co-ordinate and conterminous with living nature, and strives after a perfection which is that of nature itself.

Physiology is without this source of attractiveness. Its first lessons present difficulties to the beginner which, unless he is contented (as indeed ordinary students are) to accept as true what he does not understand, are, to say the least, discouraging; while to the more mature student who has mastered more or less some part of the subject, it fails to present a system of knowledge of which all the parts are interdependent, and can be referred to one fundamental principle, comparable to that of development or evolution.

[*Note.*—Professor Burdon Sanderson has been prevented by illness from finally revising his address, and giving all the references he would have desired.]

It is easy to understand that this must be so if we consider the present position of the subject and the nature of the work which the physiologist has to do. That work is of two kinds. He has first to determine what are the chemical and physical endowments of living matter in general, and of each of the varieties of living matter which constitute the animal and plant organism in particular. Then, these having been investigated, he has to determine how these processes are localised, so as to constitute the special function of each structure and the relation between structure and process in each case. In the actual progress of physiology the order I have indicated has not been followed, *i. e.* there has not been a correlation of structure with previously investigated process, for in former days physiologists spoke of assimilation, secretion, contraction, and the like, as expressing the special endowments of muscles, glands, or other parts, without recognising their ignorance of their real nature. But now, no one who is awake to the tendencies of thought and work in physiology can fail to have observed that the best minds are directed with more concentration than ever before to those questions which relate to the elementary endowments of living matter, and that if they are still held in the background it is rather because of the extreme difficulty of approaching them than from any want of appreciation of their importance.

It is to some of these questions that I am anxious to draw the attention of the Section to-day. I feel that I have set myself a difficult task, but think that, even should I succeed very partially, the attempt may be a useful one. And I am encouraged by the consideration that the interest they possess is one which is common to plant and animal physiology—that if we really understood them they would furnish a key, not only to the phenomena of nutrition and growth, but even to those of reproduction and development, and that it is in

the direction of elementary physiology, which means nothing more than the study of the endowments of living material, that the advance of the next twenty years will be made.

Nearly fifty years ago J. R. Mayer's* treatise on the relation between organic motion and the exchange of material in living organisms was published in Germany. Although its value was more appreciated by physicists than by biologists, it was in its purpose, as well as in its subject-matter physiological. In it Mayer showed for the first time that certain functions of the animal body, which up to that time had been considered most vital, are strictly within reach of measurement, *i. e.* referable to physical standards of quantity. He was even able to demonstrate that those quantitative relations between different kinds of energy which physicists were then only beginning to recognise, held good as regards the processes peculiar to the living organism.

Almost immediately after the appearance of this now celebrated work a series of discoveries were made in physiology, which constituted the period we are now considering an epoch. Mayer himself had proved that muscles in doing work and producing heat do not do so at the expense of their own substance. But this fact could not be understood until Bernard showed that sugar is one of the most important constituents of the blood, and its storage and production a chief function of the liver. Helmholtz next succeeded in proving what Johannes Müller† had declared to be nearly impossible, namely, that the time occupied by the propagation of a motor impulse from the brain to a muscle could be measured, and showed it to be proportional to the distance traversed. Next, du Bois-Reymond investigated the electrical phenomena of living beings, and marshalled them under a physical theory which stood its ground against the severest criticism for more than a generation. And finally, the hydrodynamic principles relating to the circulation, set forth by Dr. Thomas Young in the Croonian Lecture forty years before, were demonstrated experimentally by Ludwig at the very time when Helmholtz was giving definite form to the great natural philosopher's 'Theory of Colour Perceptions.'

The effect of these discoveries was to produce a complete revolution in the ways of thinking and speaking about the phenomena of life. The error of the past had been to believe that, although the heart resembled a pump, although digestion could be imitated in the laboratory, and comparisons of

* J. R. Mayer, 'Die organische Bewegung in ihrem Zusammenhange mit dem Stoffwechsel," Heilbronn, 1845.

† Müller's 'Physiology,' translation of 2nd edition, p. 729.

vital with physical processes could be used for illustration, it was always wrong to identify them. But, inasmuch as it had been learned that sensation is propagated along a nerve just as sound is propagated through the air, only with a tenth of the velocity, that the relations between the work done, the heat produced, and the fuel used, can be investigated in the living body just as they are in the steam engine, it now came to be felt that in other similar cases what had been before regarded as peculiarly vital might be understood on physical principles, and that for the future the word "vital" as distinctive of physiological processes might be abandoned altogether. In looking back we have no difficulty in seeing that the lines of investigation which were then initiated by such men as Helmholtz, Ludwig, Brücke, du Bois-Reymond, Donders, Bernard, are those along which, during the succeeding generation, the science of physiology advanced; nor can anyone who is acquainted with the literature of that time doubt that these leaders of physiological thought knew that they were the beginners of a new epoch. But such an epoch cannot occur again. We have adopted once for all the right, *i. e.* the scientific method, and there is not the least possibility of our recurring to the wrong. We have no new departure, no change of front in prospect; but even times which are not epochal have their tendencies, and I venture to submit to you that, in physiology the tendency of the present time is characterised by the concentration of the best efforts of the best minds on what I have already referred to as elementary questions. The work of investigating the special functions of organs, which during the last two decades has yielded such splendid results, is still proceeding, and every year new ground is being broken and new and fruitful lines of experimental inquiry are being opened up; but the further the physiologist advances in this work of analysis and differentiation, the more frequently does he find his attention arrested by deeper questions relating to the essential endowments of living matter, of which even the most highly differentiated functions of the animal or plant organism are the outcome. In our science the order of progress has been hitherto and will continue to be the reverse of the order of nature. Nature begins with the elementary and ends with the complex (first the amœba, then the man). Our mode of investigation has to begin at the end; and this not merely for the historical reason that the first stimulus to physiological inquiry was man's reasonable desire to know himself, but because differentiation actually involves simplification. For just as in manufactures it is the effect of division of

labour that less is required of each workman, so in an organism which is made up of many organs, the function of each is simpler.

Physiology, therefore, first studies man and the higher animals and proceeds to the higher plants, then to invertebrates and cryptogams, ending where development begins. From the beginning her aim has been to correlate function with structure, at first roughly; afterwards, when, as I have explained, her methods of observation became scientific, more and more accurately, the principle being that every appreciable difference of structure corresponds to a difference of function; and inversely, that each endowment of a living organ must be explained, if explained at all, as springing from its structure.

It is not difficult to see whither this method must eventually lead us. For inasmuch as function is more complicated than structure, the result of proceeding, as physiology normally does, from structure to function, must inevitably be to bring us face to face with functional differences which have no structural difference to explain them. Thus, for example, if the physiologist undertakes to explain the function of a highly differentiated organ like the eye, he finds that up to a certain point, provided that he has the requisite knowledge of dioptrics, the method of correlation guides him straight to his point. He can mentally or actually construct an eye which will perform the functions of the real eye, in so far as the formation of a real image of the field of vision on the retina is concerned, and will be able thereby to understand how the retinal picture is transferred to the organ of consciousness. Having arrived at this point, he begins to correlate the known structure of the retina with what is required of it, and finds that the number of objects which he can discriminate in the field of vision is as numerous as, but not more numerous than, the parts of the retina, *i. e.* the cones which are concerned in discriminating them. So far he has no difficulty; but the method of correlation fails him from the moment that he considers that each object point in the field of vision is coloured, and that he is able to discriminate not merely the number and the relations of all the object points to each other but the colour of each separately. He then sees at once that each cone must possess a plurality of endowments for which its structure affords no explanation. In other words, in the minute structure of the human retina we have a mechanism which would completely explain the picture of which I am con-

scious, were the objects composing it possessed of one objective quality only, being colourless, but it leaves us without explanation of the differentiation of colour.

Similarly, if he is called upon to explain the function of a secreting gland, such, *e. g.* as the liver, there is no difficulty in understanding that, inasmuch as the whole gland consists of lobules which resemble each other exactly, and each lobule is similarly made up of cells which are all alike, each individual cell must be capable of performing all the functions of the whole organ. But when by exact experiment we learn that the liver possesses not one function but many —when we know that it is a storehouse for animal starch, that each cell possesses the power of separating waste colouring matter from the blood, and of manufacturing several kinds of crystallisable products, some of which it sends in one direction and others in the opposite, we find again that the correlation method fails us, and that all that our knowledge of the minute structure has done for us is to set before us a question which, though elementary, we are quite unable to answer.

By multiplying examples of the same kind, we should in each case come to the same issue, namely, plurality of function with unity of structure, the unity being represented by a simple structural element—be it retinal cone or cell—possessed of numerous endowments. Whenever this point is arrived at in any investigation, structure must for the moment cease to be our guide, and in general two courses or alternatives are open to us. One is to fall back on that worn-out *Deus ex machina,* protoplasm, as if it afforded a sufficient explanation of everything which cannot be explained otherwise, and accordingly to defer the consideration of the functions which have no demonstrable connection with structure as for the present beyond the scope of investigation; the other is, retaining our hold of the fundamental principle of correlation, to take the problem in reverse, *i. e.* to use analysis of function as a guide to the ultra-microscopical analysis of structure.

I need scarcely say that of these two courses the *first* is wrong, the *second* right; for in following it we still hold to the fundamental principle that living material acts by virtue of its structure, provided that we allow the term structure to be used in a sense which carries it beyond the limits of anatomical investigation, *i. e.* beyond the knowledge which can be attained either by the scalpel or the microscope. We thus (as I have said) proceed from function to structure, instead of the other way.

Nor are we in thus changing direction departing from the traditions of our science. In tracing the history of some of the greatest advances, we find that the recognition of function has preceded the knowledge of structure. Haller's discovery of irritability was known and bore fruit long before anything was known of the structure of muscle. So also, at a later period, Bichat was led by his recognition of the physiological differences between what he termed the functions of organic and animal life, to those anatomical researches which were the basis of the modern science of histology. (*To be continued.*)

BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.—NEWCASTLE-UPON-TYNE, 1889.

ADDRESS by Professor W. H. FLOWER, C.B., LL.D., F.R.S., F.R.C.S., Pres.Z.S., F.L.S., F.G.S., President.

(*Concluded from* p. 23.)

IT must not be forgotten that the zealous investigator and the conscientious curator are often the direst antagonists: the one endeavours to get all the knowledge he can out of a specimen, regardless of its ultimate fate, and even if his own eyes alone have the advantage of it; the other is content if a limited portion only is seen, provided that can be seen by everyone both now and hereafter.

Such, then, is the primary principle which ought to underlie the arrangement of all museums—the distinct separation of the two objects for which collections are made; the publicly exhibited collection being never a store room or magazine, but only such as the ordinary visitor can understand and profit by, and the collection for students being so arranged as to afford every facility for examination and research. The improvements that can be made in detail in both departments are endless, and to enter further into their consideration would lead me far beyond the limits of this address. Happily, as I said before, the subject is receiving much attention.

I would willingly dwell longer upon it—indeed, I feel that I have only been able to touch slightly and superficially upon many questions of practical interest, well worthy of more detailed consideration—but time warns me that I must be bringing this discourse to a close, and I have still said nothing in reference to subjects upon which you may expect some words on this occasion. I mean those great problems concerning the laws which regulate the evolution of

organic beings, problems which agitate the minds of all biologists of the present day, and the solution of which is watched with keen interest by a far wider circle—a circle, in fact, coincident with the intelligence and education of the world. Several communications connected with these problems will be brought before the sectional meetings during the next few days, and we shall have the advantage of hearing them discussed by some of those who by virtue of their special attention to and full knowledge of these subjects are most competent to speak with authority. It is therefore for me rather delicate ground to tread upon, especially at the close of a discourse mainly devoted to another question. I will, however, briefly point out the nature of the problems and the lines which the endeavour to solve them will probably take, without attempting to anticipate the details which you will doubtless hear most fully and ably stated elsewhere.

I think I may safely premise that few, if any, original workers at any branch of biology appear now to entertain serious doubt about the general truth of the doctrine that all existing forms of life have been derived from other forms by a natural process of descent with modification, and it is generally acknowledged that to the records of the past history of life upon the earth we must look for the actual confirmation of the truth of a doctrine which accords so strongly with all we know of the present history of living beings.

Professor Huxley wrote in 1875: "The only perfectly safe foundation for the doctrine of evolution lies in the historical, or rather archæological, evidence that particular organisms have arisen by the gradual modification of their predecessors, which is furnished by fossil remains. That evidence is daily increasing in amount and in weight, and it is to be hoped that the comparisons of the actual pedigree of these organisms with the phenomena of their development may furnish some criterion by which the validity of phylogenic conclusions deduced from the facts of embryology alone may be satisfactorily tested."

Palæontology, however, as we all know, reveals her secrets with no open hand. How can we be reminded of this more forcibly than by the discovery announced scarcely three months ago by Professor Marsh, of numerous mamalian remains from formations of the Cretaceous period, the absence of which had so long been a source of difficulty to all zoologists? What vistas does this discovery open of future possibilities, and what thorough discredit, if any

were needed, does it throw on the value of negative evidence in such matters! Bearing fully in mind the necessary imperfection of the record we have to deal with, I think that no one taking an impartial survey of the recent progress of palæontological discovery can doubt that the evidence in favour of a gradual modification of living forms is still steadily increasing. Any regular progressive series of changes of structure coinciding with changes in time can of course only be expected to be preserved and to come again before our eyes under such a favorable combination of circumstances as must be of most rare occurrence; but the links, more or less perfect, of many such series are continually being revealed, and the discovery of a single intermediate form is often of immense interest as indicating the path along which the modification from one apparently distinct form to another may have taken place.

Though palæontology may be appealed to in support of the conclusion that modifications have taken place as time advanced, it can scarcely afford any help in solving the more difficult problems which still remain as to the methods by which the changes have been brought about.

Ever since the publication of what has been truly described as the "creation of modern natural history," Darwin's work on the 'Origin of Species,' there has been no little controversy as to how far all the modifications of living forms can be accounted for by the principle of natural selection or preservation of variations best adapted for their surrounding conditions, and whether any, and if so what, other factors have taken part in the process of organic evolution.

It certainly cannot be said that in these later times the controversy has ended. Indeed, those who are acquainted with scientific literature must know that notes struck at the last annual meeting of this Association produced a series of reverberations, the echoes of which have hardly yet died away.

Within the last few months also two important works have appeared in our country, which have placed in an accessible and popular form many of the data upon which the most prevalent views on the subject are based.

The first is 'Darwinism: an Exposition of the Theory of Natural Selection, with some of its Applications,' by Alfred Russel Wallace. No one could be found so competent to give such an exposition of the theory as one who was, simultaneously with Darwin, its independent originator, but who, by the title he has chosen no less than by the contents of the book, has, with rare modesty and self-abnegation, trans-

ferred to his fellow-labourer all the merit of the discovery of what he evidently looks upon as a principle of overwhelming importance in the economy of nature; "supreme," indeed, he says, "to an extent which even Darwin himself hesitated to claim for it."

The other work I refer to is the English translation of the remarkable 'Essays upon Heredity and Kindred Biological Problems,' by Dr. August Weismann, published at the Oxford Clarendon Press, in which is fully discussed the very important but still open question—a question which was brought into prominence at our meeting at Manchester two years ago—of the transmission or non-transmission to the offspring of characters acquired during the lifetime of the parent.

It is generally recognised that it is one of the main elements of Darwin's, as well as of every other theory of evolution, that there is in every individual organic being an innate tendency to vary from the standard of its predecessors, but that this tendency is usually kept under the sternest control by the opposite tendency to resemble them, a force to which the terms "heredity" and "atavism" are applied. The causes of this initial tendency to vary, as well as those of its limits and prevailing direction, and the circumstances which favour its occasional bursting through the constraining principle of heredity, offer an endless field for speculation. Though several theories of variation have been suggested, I think that no one would venture to say we have passed beyond the threshold of knowledge of the subject at present.

Taking for granted, however, as we all do, that this tentency to individual variation exists, then comes the question, What are the agents by which, when it has asserted itself, it is controlled or directed in such a manner as to produce the permanent or apparently permanent modifications of organic structures which we see around us? Is "survival of the fittest" or preservation by natural selection of those variations best adapted for their surrounding conditions (the essentially Darwinian or still more essentially Wallacian doctrine) the sole or even the chief of these agents? Can isolation, or the revived Lamarckian view of the direct action of the environment, or the effects of use or disuse accumulating through generations, either singly or combined, account for all? Or is it necessary to invoke the aid of any of the numerous subsidiary methods of selection which have been suggested as factors in bringing about the great result?

Anyone who has closely followed these discussions, espe-

cially those bearing most directly upon what is generally regarded as the most important factor of evolution—natural selection or "survival of the fittest"—cannot fail to have noticed the appeal constantly made to the advantage, the utility, or otherwise, of special organs or modifications of organs or structures to their possessors. Those who have convinced themselves of the universal application of the doctrine of natural selection hold that every particular structure or modification of structure must be of utility to the animal or plant in which it occurs, or to some ancestor of that animal or plant, otherwise it could not have come into existence; the only reservation being for cases which are explained by the principle which Darwin called "correlation of growth." Thus the extreme natural selectionists and the old-fashioned school of teleologists are so far in agreement.

On the other hand, it is held by some that numerous structures and modifications of structures are met with in nature which are manifestly useless; it is even confidently stated that there are many which are positively injurious to their possessor, and therefore could not possibly have resulted from the action of natural selection of favorable variations. Organs or modifications when in an incipient condition are especially quoted as bearing upon this difficulty. But here, it seems to me, we are continually appealing to a criterion by which to test our theories, of which we know far too little, and this (though often relied upon as the strongest) is, in reality, the weakest point of the whole discussion.

Of the variations of the form and structure of organic bodies we are beginning to know something. Our museums, when more complete and better organised, will teach us much on this branch of the subject. They will show us the infinite and wonderful and apparently capricious modifications of form, colour, and of texture to which every most minute portion of the organisation of the innumerable creatures which people the earth is subject. They will show us examples of marvellously complicated and delicate arrangements of organs and tissues in many of what we consider as almost the lowest and most imperfectly organised groups of beings with which we are acquainted. But as to the use of all these structures and modifications in the economy of the creatures that possess them we know, I may almost say, nothing, and our museums will never teach us these things. If time permitted I might give numerous examples in the most familiar of all animals, whose habits and actions are matters of daily observation, with whose life-history we are

as well acquainted almost as we are of our own, of structures the purposes of which are still most doubtful. There are many such even in the composition of our own bodies. How, then, can we expect to answer such questions when they relate to animals known to us only by dead specimens, or by the most transient glimpses of the living in a state of nature, or when kept under the most unnatural conditions in confinement? And yet this is actually the state of our knowledge of the vast majority of the myriads of living beings which inhabit the earth. How can we, with our limited powers of observation and limited capacity of imagination, venture to pronounce an opinion as to the fitness or unfitness for its complex surroundings of some peculiar modification of structure found in some strange animal dredged up from the abysses of the ocean, or which passes its life in the dim seclusion of some tropical forest, and into the essential conditions of whose existence we have at present no possible means of putting ourselves in any sort of relation?

How true is it that, as Sir John Lubbock says, "we find in animals complex organs of sense richly supplied with nerves, but the functions of which we are as yet powerless to explain. There may be fifty other senses as different from ours as sound is from sight; and even within the boundaries of our own senses there may be endless sounds which we cannot hear, and colours as different as red from green of which we have no conception. These and a thousand other questions remain for solution. The familiar world which surrounds us may be a totally different place to other animals. To them it may be full of music which we cannot hear, of colour which we cannot see, of sensations which we cannot conceive."

The fact is that nearly all attempts to assign purposes to the varied structures of animals are the merest guesses and assumptions. The writers on natural history of the early part of the present century, who "for every why must have a wherefore," abound in these guesses, which wider knowledge shows to be untenable. Many of the arguments for or against natural selection, based upon the assumed utility or equally assumed uselessness of animal and vegetable structures, have nothing more to recommend them. In fact, to say that any part of the organisation of an animal or plant, or any habit or instinct with which it is endowed, is useless, or even injurious, seems to me an assumption which, in our present state of knowledge, we are not warranted in making. The time may come when we shall have more

light, but infinite patience and infinite labour are required before we shall be in a position to speak dogmatically on these mysteries of nature—labour not only in museums, laboratories, and dissecting-rooms, but in the homes and haunts of the animals themselves, watching and noting their ways amid their natural surroundings, by which means alone we can endeavour to penetrate the secrets of their life-history. But until that time comes, though we may not be quite tempted to echo the despairing cry of the poet, "Behold, we know not anything," a frank confession of ignorance is the most straightforward, indeed the only honest position we can assume when questioned on these subjects.

However much we may be convinced of the supreme value of scientific methods of observation and of reasoning, both as mental training of the individual and in the elucidation of truth and advancement of knowledge generally, it is impossible to be blind to the fact that we who are engaged with the investigation of those subjects which are commonly accepted as belonging to the domain of physical science are unfortunately not always, by virtue of being so occupied, possessed of that most precious gift, "a right judgment in all things."

No one intimately acquainted with the laborious and wavering steps of scientific progress (I can answer at least for one branch of it) can look upon that progress with a perfect feeling of satisfaction.

Can it be said of any of us that our observations are always accurate, the materials on which they are based always sufficient, our reasoning always sound, our conclusions always legitimate? Is there any subject, however limited, of which our knowledge can be said to have reached finality?

Or if it happens to any of us as to

> "A man who looks at glass
> On it may stay his eye,
> Or if he pleases through it pass
> And then the heavens espy,"

are not those heavens which are beyond the immediate objects of our observation coloured by our prejudices, prepossessions, emotions, or imagination, as often as they are defined by any profound insight into the depth of nature's law? In most of these questions an open mind and a suspended judgment appear to me the true scientific position, whichever way our inclinations may lead us.

For myself, I must own that when I endeavour to look

beyond the glass, and frame some idea of the plan upon which all the diversity in the organic world has been brought about, I see the strongest grounds for the belief, difficult as it sometimes is in the face of the strange, incomprehensible, apparent defects in structure, and the far stranger, weird, ruthless savagery of habit, often brought to light by the study of the ways of living creatures, that natural selection, or survival of the fittest, has, among other agencies, played a most important part in the production of the present condition of the organic world, and that it is a universally acting and beneficent force continually tending towards the perfection of the individual, of the race, and of the whole living world.

I can even go further and allow my dream still thus to run:

"Oh yet we trust that somehow good
Will be the final goal of ill,—

That nothing walks with aimless feet,
That not one life shall be destroyed
Or cast as rubbish to the void
When God hath made the pile complete."

ROYAL COLLEGE OF VETERINARY SURGEONS.

QUARTERLY MEETING OF COUNCIL, HELD JANUARY 9TH, 1890.

The President, Professor AXE, in the chair.

Present:—Professors Brown, McCall, Walley; Sir Henry Simpson, Dr. Fleming; Messrs. T. Greaves, P. Taylor, H. Kidd, J. Roalfe Cox, F. W. Wragg, W. Wilson, W. J. Mulvey, J. Simpson, T. Campbell, J. D. Barford, H. R. Perrins, W. Hunting.

The *Solicitor* (*Mr. Thatcher*), in the absence of the Secretary through illness, read the notice convening the meeting.

The minutes of the previous meeting were taken as read and confirmed.

The *Solicitor* announced that letters expressing regret at inability to attend had been received from Professor Williams, Professor Pritchard, Mr. Woods, Mr. Whittle, Mr. Lambert, and Sir Frederick Fitzwygram.

Presentations.

The *Solicitor* announced the following presentations to the library:—The 'Calendar of the Royal College of Surgeons, England'; 'Equine Medicine,' by Professor Robertson, presented by his widow; and Volume I of the *Veterinary Record*, presented by the Editor.

Mr. Taylor moved that the thanks of the Council be presented to the donors for the books.

Mr. Greaves seconded the motion, which was agreed to.

Letter of Condolence to the Widow of the late Mr. E. C. Dray.

Dr. Fleming thought that before they proceeded further with the business of the College, it would be an act of kind remembrance and recognition if they noticed the loss they had sustained in the death of Mr. Dray. He felt sure that he carried with him the sentiment of the whole profession in saying that both the Council and the profession had sustained a heavy bereavement in the loss of Mr. Dray. For many years he had been a constant attendant at their Council meetings, and had held the responsible position of Treasurer, and he had fulfilled the duties pertaining to that office with the fullest satisfaction to the profession. He therefore begged to move that a letter of condolence be sent to Mrs. Dray expressing the extreme regret which the profession felt at the loss it had sustained, and also desiring that the sympathy of the Council be tendered to her in her heavy loss.

Mr. Greaves seconded the motion.

Professor Walley supported.

The motion was unanimously agreed to.

Report of Registration Committee.

The *Solicitor* read the report.

Mr. Barford moved its adoption.

Dr. Fleming seconded the motion, which was agreed to.

Report of the General Purposes Committee.

The *Solicitor* read the report.

Professor Walley moved the adoption of the report. He also begged to move that Mr. Greaves' very kind offer to double the window of the Council chamber be accepted. Judging from what he knew of the effect of such an alteration, he thought it would be of the greatest possible advantage to the acoustic properties of the room.

Mr. Barford seconded the motion, which was agreed to.

Report of the Finance Committee.

The *Solicitor* read the report.

Dr. Fleming moved its adoption, and also that cheques be drawn to cover outstanding liabilities.

Mr. Taylor seconded the motion, which was agreed to.

Report of Committee re *Government Grant and Meat Inspection.*

The *Solicitor* read the report.

Mr. Hunting protested that the motion passing the recommendation *re* Government grant was never seconded, and therefore it could not be a resolution. There were only three members present at the meeting; two disagreed, and the Chairman gave the casting vote.

Sir Henry Simpson said that Mr. Hunting had not lodged any formal objection with the Secretary.

The *President* said that the only satisfactory mode of procedure would be to refer the matter back to the Committee.

Mr. Taylor then moved that it be referred back to the Committee.

Mr. Campbell seconded the motion, which was agreed to.

Mr. Taylor moved that the portion of the report referring to meat inspection be adopted.

Mr. Campbell seconded the motion, which was agreed to.

Report of Committee re *recognition of Foreign and Colonial Schools.*

The *Solicitor* read the report.

The *President* said that by Section 13 of their Act, if they recognised foreign and colonial schools, graduates from such schools were entitled, after having been in practice for a certain number of years, to register their names at the College and to become to all intents and purposes members of the Royal College of Veterinary Surgeons. Of course, that depended upon the Royal College having recognised the school whose graduate sought to be registered. In Bye-law 35 it was provided that a person holding a diploma from any medical examining body recognised by law should be exempt from attendance in the first year's course of lectures, and from the examination at the end of that year. "A student holding a foreign or Colonial veterinary diploma from any veterinary examining body recognised by the Council of the Royal College of Veterinary Surgeons shall be exempt from attendance of the course of lectures for the first two years, and from the examination at the end of those years respectively." Up to the present time it had been the practice of the schools to receive graduates from foreign and Colonial schools, and to allow them the privileges laid down in the Bye-law, according to which they might study one session at one of the colleges, receive the diploma, and be registered as members of the Royal College of Veterinary Surgeons. The schools had evidently been going astray, as the Bye-law said that intending graduates should be from recognised schools. Until the Council recognised the foreign and Colonial schools, the schools of this country could not allow them the privileges provided in the Bye-law.

Mr. Roalfe Cox proposed that the word "recognised" should be left out in the Bye-laws.

Professor Walley thought that if that omission was made the profession would be swamped with Colonial veterinary practitioners.

Sir Henry Simpson said that up to the present the Royal College had recognised these Colonial students, and the schools had on that understanding taken them with their diplomas and passed them on to the College for the diploma. It seemed to be

the desire of the Committee, and, he imagined, of everybody, that that should be put an end to. He thought they had better adopt the recommendation of the Committee.

Professor McCall suggested that an official letter should be sent to each of the principals of the schools, intimating that for the future no Colonial graduates would be allowed to be examined. As for the few Colonial students who were now studying in this country, they should be allowed to run their course and come up for examination in their due time.

Dr. Fleming thought that the Bye-laws should stand; that those graduates who wished to become members of the Royal College of Veterinary Surgeons be allowed to enter the schools as before, but the schools must be recognised ones. He thought it would be invidious to mention the recognised schools. It should be understood by the Royal College that only those schools whose curriculum was equal to its own were recognised schools.

Mr. Taylor moved the adoption of the report as it stood, with the omission of the names of the colleges.

Professor Walley seconded the motion, which was agreed to.

Report from the Court of Examiners.

The *Solicitor* read the report.

Mr. Taylor moved the adoption of the report, and the motion was agreed to.

Appointment of Treasurer.

Dr. Fleming proposed Mr. Wragg as successor to Mr. Dray. He had, he said, been already assisting Mr. Dray, and he knew well the state of the College finances, and how they were regulated.

Professor Walley seconded the motion, which was unanimously agreed to.

Mr. Wragg thanked the Council for the great honour they had conferred upon him, and assured them that he would use his best endeavours to carry out the duties of the office in the same exemplary manner in which they had been carried out by his predecessor.

Election of Vice-President in the room of Mr. E. C. Dray.

Mr. J. Simpson thought that it would be a very graceful act if they did not fill up the vacancy in the list of Vice-Presidents caused by the death of Mr. Dray. It would be a graceful act on the part of the Council to a good man who had served the College for a considerable length of time. According to the Charter, it was necessary for them to appoint a successor to the Treasurer, but that was not the case with the Vice-Presidents.

Dr. Fleming seconded the motion. He thought it would be a very graceful act not to fill up the vacancy.

The resolution was unanimously agreed to.

Appointment of Auditors.

Mr. Taylor moved that the auditors, Messrs. Alfred Broad and Joseph Woodger, who acted the previous year, should be asked to act again.

Mr. Wragg seconded the motion, which was agreed to.

Appointment of Committee to arrange Annual Report.

Mr. Taylor moved that the Committee be as follows:—The President, Sir Henry Simpson, Dr. Fleming, and Mr. Roalfe Cox.

Mr. Campbell seconded the motion.

Mr. Wragg suggested the name of Mr. Hunting.

Dr. Fleming thereupon wished his name to be withdrawn.

Mr. Taylor then amended his resolution as follows:—The President, Sir Henry Simpson, Mr. Roalfe Cox, Mr. Wragg, and Mr. Hunting.

The resolution in its amended form was agreed to.

Appointment of the Body for the Examination of Students in General Education and fixing Fees.

The *President* said that the Council would remember that a motion had been carried to the effect that the examinations in preliminary education should be uniform in character, and that they should be performed by one body. Their present object was to appoint a body for that purpose.

Mr. Wilson proposed that the duty of examining the students should be placed in the hands of the College of Preceptors and the Educational Institute of Scotland jointly, and that they should have the power of examining all candidates who did not possess or exempting certificates of having passed the previous matriculation examination. He thought it was much better that it should be put in the hands of a Joint Board. Then they would have a uniform examination throughout the United Kingdom; the fees to be such as the Joint Board were disposed to charge.

Professor McCall seconded the proposition.

Professor Walley pointed out that by this proposal they would gain the uniformity that they had all along desired.

Sir Henry Simpson asked whether any sort of conference had been held, or whether any advance had been made to these bodies so as to ascertain whether they were willing to act.

Mr. Wilson said he would amend his resolution, adding "if they consent."

Sir Henry Simpson desired that some limit should be put to the fees.

The *President* thought it would be better that the matter should be left to a small committee.

Mr. Wilson's motion was then carried.

Professor Walley moved that the fees be fixed, and that they do not exceed one guinea.

Mr. Greaves seconded the motion, which was agreed to.

Professor Walley said that, so far as the Educational Institute of Scotland was concerned, he had every reason to believe that they would work heart and soul to carry out the wishes of the Council. He proposed that a committee be formed to confer with the two bodies.

Professor McCall seconded the motion.

It was ultimately arranged that Dr. Fleming, Mr. Barford, and Sir Henry Simpson should form the committee.

Professor Brown suggested that steps should be taken to let men know when they had to come up for their examinations, where they had to go, and at what time. He thought that the date of the next examination might be fixed at once.

It was then arranged that the next examination should commence in London on the 14th and in Scotland on the 21st of May.

Notice of Motion by Mr. Kidd.

Mr. Kidd in moving the following resolution, of which he had given notice: "That steps be taken to obtain a new charter," said he fancied that some objection might be raised against this step on account of the expense. It has been variously estimated to cost from £200 to £600: but those who have had some experience in that matter say that it cannot cost more than £300. Be that as it may, if a new charter will confer greater benefits on the body corporate it will be money well spent. It is necessary to have a new charter, because a large majority of those members of the profession who take an interest in its affairs ask for certain reforms which cannot be instituted without the legal power.

The first and most important provision necessary in a new charter is to strengthen the clause in the original charter of 1844, with respect to the title of veterinary surgeon (see p. 18 in Register of 1889), which says:—"And we do further declare and grant that the veterinary art, as practised by the members of the said body politic and corporate shall be henceforth deemed and taken to be and recognised as a profession, and that the members of the said body politic and corporate solely and exclusively of all other persons whomsoever shall be deemed and taken and recognised to be members of the said profession or professors of the said art, and shall be individually known and distinguished by the name or title of veterinary surgeon."

It is very difficult to understand why those persons who are placed in the Register of Royal College of Veterinary Surgeons as "existing practitioners" have been permitted to use the title of veterinary surgeon. There is not a single line or clause in the Veterinary Surgeons Act which takes away from the members of the body politic and corporate the exclusive right to the title of veterinary surgeon granted in 1844; but, on the contrary, the Act confirms that charter and that special clause in the charter. The

preamble to that Act distinctly says:—"Whereas it is expedient that provision be made to enable persons requiring the aid of a veterinary surgeon for the cure or prevention of diseases in or injuries to horses and other animals between qualified and unqualified practitioners." Section 13, clause 3, makes the distinction clear (see last seven lines):—"A recognised veterinary diploma is a veterinary diploma recognised for the time being by the Council of the said Royal College as furnishing a sufficient guarantee of the possession of the requisite knowledge and skill for the efficient practice of veterinary surgery, and as entitling the holder thereof to practise veterinary surgery in the British possession or foreign country wherein the diploma was granted." Section 14 confirms the original charter. Section 15, clauses 1, 2, and 3, provides for the registration of "existing practitioners." Section 4 expressly states, "No person registered under this section shall be deemed to be a member of the said Royal College within the said charters or this Act," and consequently cannot use the title of veterinary surgeon. Section 17 makes a further distinction by designating those qualified as "veterinary surgeons" and those registered "existing practitioners" as "veterinary practitioners." It is therefore clearly the duty of the Council of the Royal College of Veterinary Surgeons to see that none but the members of the body politic and corporate are permitted to use the title of veterinary surgeon.

The next point to which he desired to draw attention is the desirability of abrogating that disfranchising clause in the charter of 1876. I refer to Clause 9 he said, and that it was unnecessary that he should take up their time by repeating what has been so clearly advocated on this clause in the veterinary journals by different members of the profession. Up to the present moment not one valid reason has been advanced in support of the step taken by the Council of that year for taking away the privileges which members of the body politic and corporate had enjoyed for thirty-two years; and it would be an act of justice on the part of the present Council to restore to those members of the profession the rights and privileges of which they were then deprived. If Clause 9 had been made prospective instead of retrospective, he was quite convinced that there is not a member who would either have spoken or written against it.

The time has come in the history of our profession when it is imperative to make a distinction between members of Council and members of the Examining Board. The former must possess complete control over the affairs of the profession, subject to the vote of its members. The latter must be separate and subordinate to the former. He had heard an examiner say, Why disfranchise them? He failed to see that this can by any stretch of imagination be called disfranchisement, because they have the right and privilege of choosing whether they prefer to serve the body corporate on the Council (if elected) or serve the Council as examiners.

The arguments which have been adduced in the discussion of this subject in the professional journals in favour of the abolition of "dual appointment" are so conclusive and unanswerable that he need not further refer to the subject.

Circumstances have occurred of late years in the selection of Vice-Presidents, that it is worth while considering the advisability of altering the method of their election. The abuse of any privilege or power frequently renders it desirable to seek for a remedy. He did not think that anyone will deny that the honour which was at one time associated with the election of a member of the profession as a Vice-President has departed because it has now become exclusively the retreat for candidates who have been rejected at the annual election. Now, in his humble judgment, it would be the means of strengthening the hands of the Council, adding dignity to it, and a source of gratification to the body corporate if all members of Council (other than those to whom he should presently refer) be elected by the profession, and that Vice-Presidents be elected by the Council from its own members.

The next subject which he desired to submit for consideratiou in connection with the proposed New Charter he freely admitted has not been so fully discussed by the profession as those already referred to. He was of opinion that the principal of each veterinary school, the principal veterinary surgeon to the army, the veterinary adviser to the agricultural department of the Privy Council, and the chairman of the Board of Examiners should be *ex officio* members of Council in virtue of the respective offices they hold.

There is yet one important provision which would tend more than anything else to elevate the status of the members of the body corporate, but whether a clause can be inserted in a charter conferring full power and carrying penalties is a question for our legal adviser to decide. He referred chiefly to members of the profession who are guilty of unprofessional conduct, such as the publishing of recipes for the cure of certain diseases, and giving advice in agricultural papers and publications. Let us follow the example of the medical profession in this respect, and make coverture a punishable offence, and we too will rise in the social scale, and will take a position which will soon command respect. If such cannot be done by charter let us ask for an Act of Parliament.

He would merely mention one more step which in his opinion would greatly tend towards uniting and strengthening the profession, but feared it was premature for adoption. We allude to dividing Great Britain and Ireland into districts, and elect a representative from each district on the Council.

In conclusion, he would ask the members to avoid following the example of some in a larger legislative assembly in criticising men not measures. He had no other motive in bringing this matter before them than that of furthering the best

interests of the profession, and of fulfilling the pledge given at last election. If they were satisfied that a charter on the lines indicated will prove beneficial to the body corporate, he asked for their co-operation in obtaining it. But, on the other hand, if they were convinced that it will prove detrimental to the best interests of the profession, then he asked them to vote against the resolution which he now proposed, "That steps be taken to obtain a new charter."

Mr. Mulvey seconded, but thought that the matter should be put into the hands of a committee to consider the advisability of altering the charter.

Mr. James Simpson thought that if the matter was to go beyond that day the best committee to consider it would be the Parliamentary Committee already appointed.

Mr. Roalfe Cox proposed that the matter should go no further. It would be a great expense, and it was not very promising. He thought, too, that they should be extremely careful how they dealt with the College funds.

Professor Walley asked Mr. Kidd if he would not alter his motion that the matter should be referred to a committee.

Mr. Kidd said he would accept the suggestions that had been made, but he would not be in favour of handing it over to the Parliamentary Committee.

Professor Brown thought that as none of the Council seemed to be very enthusiastic about the proposition, and as the committee had to be selected from the members of the Council, he did not quite see the use of adjourning the matter for an indefinite period. He also thought that the proposition would amount to an amendment of the Act.

Dr. Fleming proposed that the question be decided at that meeting.

Mr. Hunting said that although disagreeing with some portions of Mr. Kidd's remarks, he meant to support the resolution. He hoped the matter would be thoroughly considered by a committee appointed by the Council. He thought it would be a great benefit if they could have one charter instead of four.

Mr. Greaves said that, as the charters had been consolidated by the Act of Parliament, and they could not alter an Act of Parliament by a charter, if they wanted to make any alteration they would have to get another Act of Parliament to override their present Act.

Mr. Kidd said that he did not for one moment think that any new charter would override the Act. What he did want to know was why the Act was not put into force in regard to titles.

Sir Henry Simpson thought that most of the alterations proposed by Mr. Kidd were entirely against the spirit of the age.

Dr. Fleming thought that members of the profession who agitated for alterations in the constitution of the profession should first well understand that constitution. The title of veterin-

ary surgeon was never claimed as the exclusive right of the Royal College. Until the passing of the Act even the title of Member of the Royal College of Veterinary Surgeons was not protected. In the House of Commons there was the very strongest feeling in favour of those gentlemen who had been in practice, and the House of Commons would have rejected any attempt to pass a Bill which excluded those gentlemen from the use of the title.

Mr. Hunting moved an amendment that a committee should be appointed to consider the matter, which found no seconder.

The original motion of Mr. Kidd was then put to the meeting, and negatived by a large majority.

Professor Walley's Notice of Motion.

Professor Walley moved the following resolution, of which he had given notice:—"That in the opinion of this Council the Law as it relates to Glanders and Farcy requires to be materially amended, more particularly in reference:

"(1) To the general supervision of infected studs.

"(2) In reference to the slaughter of diseased animals.

"(3) In reference to the disposal of horses from infected premises."

He thought that the present regulations in reference to glanders were very loose indeed. At the present time, when an outbreak of glanders occurred, the attention of the Local Authorities was directed to it; but the man, if he did not choose to conform to the direction of the Local Authority, could keep his glandered horses for a matter of fourteen or twenty-one days, or even a longer time. The present regulations, too, with regard to the disposal of horses from infected areas left much to be desired. There was practically no supervision exercised over infected studs.

Mr. Greaves seconded the motion, which was agreed to.

Notices of Motion.

Mr Roalfe Cox gave notice of his intention to move the following resolution at the next Council Meeting—(1) "That, with the view to promote and maintain the dignity of the veterinary profession, this College take means to regulate the professional conduct of its members. (2.) For the guidance of this College, that means be taken forthwith to ascertain what provisions with regard to their members respectively have been established by the Royal College of Surgeons, the Royal College of Physicians, the Society of Apothecaries, and the Pharmaceutical Society. (3.) That means be taken forthwith by this College to acquire full power, if it has not now full power, to determine questions of proper professional conduct on the part of its present or future members, and power also to create and to enforce penalties for infringement or breach thereof."

Mr. Hunting gave notice that he would move a resolution to the effect that the Council should arrange the hours as well as

the day of examinations, so that, not only should the students be there at the proper time, but that the examiners should be there at the proper time.

Vote of Thanks.

Mr. Barford moved a vote of thanks to the President for presiding.

Mr Roalfe Cox seconded the motion, which was agreed to.

EPIDEMIOLOGICAL SOCIETY OF LONDON.

Sir T. Crawford, K.C.B., M.D., President, in the chair.

Malaria.—*Sir William Moore* remarked it had been stated that malaria caused more human misery than any other known cause of disease. *Many theories had been originated as to the nature of malaria*, but hitherto he considered we were ignorant of what malaria really was. He did not believe that the bacillus malariæ of Crudeli and Klebs was the true malaria germ, any more than he admitted that the spores of algoid plants of the palmetta species, stigmatised as such years ago by Salisbury, was the true malaria germ. He mentioned what had been advanced by Klebs, Crudeli, Marchiafava, Laveran, and others, on the subject of the bacillus malariæ. But there were fatal objections. The bacillus had not been found everywhere where paroxysmal fevers prevailed. Neither was it reasonable to suppose that every kind of surface on which paroxysmal fever occurred would produce the same kind of bacillus. It was said to require heat and moist earth. But malarious fevers prevailed in sandy deserts. where water was hundreds of feet from the surface; and on bare rocks, where there was no earth, although plenty of moisture in the form of dew at some seasons of the year. Moreover, credible authorities had stated that malarious fever might occur in half-an-hour after exposure; and was it to be supposed that in that short time the bacillus malariæ entered the spleen and marrow of the bones (where they were supposed to reside until coming into action), increased and multiplied, and then sallied forth to excite fever? Moreover, he would ask what became of the bacilli when a person recovered? Evidently they did not pass into the atmosphere, or malarious fever would be infectious. Then it was also well known that a person might have an attack of ague, months, or even years, after the primary seizure. Was it to be supposed that the bacilli remained in the system all that time? Curious things were found in the blood of human beings in different parts of the world. Manson had theorised that the filaria sanguinis hominis was the cause of elephantiasis, but filariæ were found in the blood of persons who were not suffering from elephantiasis. Indeed, it had been stated that 10 per cent. of the Chinese had filaria in their blood.

Again, the spirillum which Carter thought distinctive of relapsing fever had been found in the blood of persons not so affected. Sir William Moore considered that a more rational and a more recognisable cause for paroxysmal fevers and malarious diseases generally could be found. Dr. Maclean had said that the heat-generative powers of all victims of malaria were impaired, and their skin, in consequence of the excitation and consequent debility from heat became so sensitive, that they were specially liable to all changes of temperature. The effects of heat on the human system were referred to at some length. It was formerly taught that congestions and inflammations were originated by the rush of blood to internal organs consequent on a chilled surface, and probably this teaching was not altogether incorrect. Others had regarded chill as acting by a depressant effect on the nervous system. It was more recently advanced that chill indicated disturbance of protoplasmic molecular correlations, or, in chemical language, that new bodies were evolved in the protoplasm, which acted as veritable poisons. With regard to the periodicity which was supposed to characterise maladies produced by malaria, periodicity was a characteristic of all Nature, more or less; but there was no periodicity in enlarged spleen supposed to arise from malaria, and even ague sometimes became so irregular that it lost all claim to be considered a periodic malady. When ague presented in temperate climates, it did so in the autumnal season, when changes of temperature were greatest, and it did so in marshy localities where damp was added to cold, damp cold having the greatest power of abstracting heat. His position was, that so-called malarious fevers were caused by the sudden abstraction of heat or chill, under the influence of cold, and especially of damp cold; and that the characteristic effects of chill were most marked in hot climates, because of the antecedent exposure to great solar heat and disregard of suitable precautions. He thought if they could wash in the waters of Lethe, so as to emerge fresh to the subject, the contradictions involved in the theory of malaria would lead to the abandonment of the belief. It was the heat, and not the malaria of tropical climates which produced anæmia and blood degeneration, as well as fevers.

[We insert this report at the special request of a contributor to our Journal, who has resided in India, and who considers it may especially interest residents in the East.—EDS.]

LINCOLNSHIRE VETERINARY MEDICAL ASSOCIATION.

A MEETING of the above Association was held at the Albion Hotel, Lincoln, October 31st, 1889.

Present: B. Freer, Esq. (in the chair); Messrs. W. H.

Brooks, W. B. Dickinson, F. L. Gooch (Hon. Sec.), J. H. Goodall, J. W. Gresswell, C. Hartley, F. A. Holmes, J. Mackinder, T. J. Marriott, Capt. B. H. Russell, Messrs. J. Smith and T. Smith. Professor Pritchard, of London, also attended.

On the motion of *Mr. Mackinder*, seconded by *Capt. Russell*, the minutes of the last meeting were taken as read.

Letters of apology for their absence were read from Messrs. Greaves, Manchester; Clark, March; Hardy, Sleaford; Rudkin, Grantham; Holmes, Bourne; Howse, Lincoln; and Professor Walley, Edinburgh.

The *Hon. Secretary* brought forward the question of the instruments belonging to the Association, and after some discussion it was resolved, on the motion of *Mr. Marriott*, that Capt. Russell be requested to take charge of the instruments, and that any member requiring them should pay the carriage of same each way.

Capt. Russell undertook to take charge of the instruments.

Capt. Russell, according to notice, proposed an alteration of Rule V.

Mr. Goodall seconded the motion, which was agreed to.

Mr. Mackinder proposed the appointment of a sub-committee to examine the existing rules of the Association, and report to the annual meeting.

Capt. Russell proposed the appointment of the Chairman, Messrs. Mackinder and Gresswell, and the Hon. Secretary as such sub-committee, which was seconded by *Mr. Goodall*, and carried.

The *Chairman* then introduced Professor Pritchard to the meeting to deliver a lecture on "Curb."

Professor Pritchard said: I will begin my remarks by thanking you, Mr. Chairman, for the kind manner in which you have introduced me to the meeting. My object, or at all events my principal object, in selecting this one word "Curb" has been to excite discussion, and I most fervently invite it upon the one point as to what a curb really is. In ordinary parlance it is an enlargement of the back of the hock, about opposite or a little above the ordinary seat of spavin. I have a view about the matter which I think is different to that of most other people, and I want, if I possibly can, either to prove that my idea is a correct one or to find from the arguments that may be advanced by you that I am incorrect. To do this it will be necessary for me to make some few remarks with reference to the anatomy of the structures which are or are said to be involved in this disease. To begin, if we slit open the skin at the back of the hock, and remove the connective tissue there, the first structure we come upon of any importance is the post-annular ligament, and we find this extending, as you will see from the specimen I have here, from the lower part of the calcis about four to five inches in a downward direction. It is attached

to both sides of the bones of the hock, and binds down the whole of the structures, the ligaments and tendons more particularly which pass down the back of the joint. Passing from that a moment, let me remind you that in connection with the hock, we have some of the most powerful ligaments there are in the whole body. The bones of the hock, which you know are numerous, are so connected together by ligamentous structures that it is almost, in fact, impossible, to separate them without having recourse to maceration or boiling. For an example of this, if you will take a cuneiform medium and magnum, two of the central bones of the joint, I will defy any one to separate them without fracturing the bones, unless they have recourse to boiling or maceration. Another ligament which is, I think, equally powerful, and one which I shall have to allude to, is one which runs from the back of the calcis, and is termed the calcaneo-cuboid ligament. Passing again to the post-annular ligament, I may tell you that between it and the tendons there is a portion of synovial membrane, which we term a sheath. I must here allude to the different forms of synovial membrane we find in the body, because I shall read a quotation presently which bears upon it. The synovial sheath is a portion of synovial membrane placed between a ligament and a tendon, or between two tendons. The synovial bursa, another form of synovial membrane, is a synovial sac, placed between a prominence of bone and a ligament or a tendon. Another form of synovial membrane we have is that which we find in free-moving joints. Let us exemplify this if we can. Between the perforatus and perforans, immediately below the knee, we have a synovial sheath. Perhaps the best specimen of a synovial bursa is between the middle tubercle of the head of the humerus and the flexor brachii. There are scores of examples in synovial membranes. We have, passing down the back of the hock, the perforatus tendon close under this annular ligament from the body of the os calcis; passing the perforatus tendon and underneath the two we have a so-called calcaneo-cuboid ligament. Between the perforatus tendon and the body of the os calcis there is a large bursa. Between the perforatus tendon and the structure immediately inside that is a synovial sheath, and between this post-annular ligament and tendon is another synovial sheath. If you have followed me in this anatomy, I think you will be able to follow out what I have to say with reference to the opinions of others as to what a curb is, and I think it will perhaps enable you to argue the point with me as to whether I am correct in my ideas. Some years ago I put myself to very considerable trouble to search out the ideas of men who have written upon this subject. I have gone back as far as 1700, and I think I have read most of the works, because I made it rather a special point with myself from that day to the present. I am not going to trouble your minds with what they say beyond this—that none of them, although they get very close to

the mark, agree with my idea on the subject. I intend to deal more particularly with men of our own time, men whose ability has been great, based upon their own mental power and the knowledge of what has gone before them. Those are the men that I shall deal with to-day, and I will begin by mentioning the name of a man whom I am sure every one in this room admires—the late Professor Spooner. He taught—and he and I have argued the point more than once—that curb was a sprain of the annular ligament. Well, now, I have dissected scores and scores of cases, and I have never yet seen the slightest thickening of the posterior annular ligament in a case of curb. It is true that its function, and a very important one unquestionably, is that of binding down and holding in proper position the tendons which pass from the back of it; and it is a very reasonable conclusion to come to that the causes which we know give rise to curb may give rise to a partial laceration—for that is what we understand by a sprain—of the structure which is at the back of the joint. But my argument is this—that if such laceration took place as a consequence of the inflammation, it would be set up in the structure, because white fibrous tissue does not usually take on inflammatory action; when it is inflamed it becomes thickened. I have not yet seen a case where the post-annular ligament has been thickened. There is an enlargement—there is no question about that. Your grooms will tell you there is an enlargement, and therefore there must be something to produce that enlargement; and if it were a diseased condition of the post-annular ligament, I say that that diseased condition would give rise to a thickening which we do not find on dissecting a case of curb. Another opinion is that of a man I esteem very highly. He is a very intimate friend of mine, and I look upon him as one of the most practical veterinary surgeons existing. I allude to Professor Williams. His description is this: A curb is a sprain of the "calcaneo-cuboid" ligament. You can call to mind the strength and position of the calcaneo-cuboid ligament; it is one of the most powerful ligaments in the body, and the remarks I have made with regard to the post-annular ligament, will apply to this calcaneo-cuboid ligament. I have never yet seen it thickened. I have never yet seen it in a diseased condition, except through an injury such as a kick from a horse. I have never yet seen the slightest trace of disease in that ligament, and if you examine the strength of it, you will come to the conclusion that it would be an enormous effort on the part of the animal that could possibly injure it. It runs down the back of the os calcis. It is half an inch in thickness, and is firmly implanted into the cuboid bone, and is strong enough to hang a horse on. I am relying on my post-mortem examination as to my idea of curb, and I cannot come to any other conclusion than that that ligament is not involved; and there is this that contradicts Professor Williams' argument more than anything else—it is not in the position of curb. We will pass from that to another

opinion, which I am rather inclined to think was borrowed from Professor Williams. I am alluding to General Fitzwygram's book. He says: Curb is a sprain of the calcaneo-cuboid ligament or the post-annular ligament. That is rather a mixed opinion between Professor Williams and Professor Spooner; therefore I need not make any further remarks about it. I should be rather inclined to think that the General—with all due deference to him—has not made many dissections of curb, or he would not have come to such a conclusion. It is either one thing or the other, or they are both wrong. I am now coming to an opinion which gets as close to mine as anything I have read, and that is Percival. His anatomy is all wrong. If he had happened to have left out the word "tendon," I should have gone all the way with him. Having dealt with other people's opinion, I will tell you briefly what mine are. Between this post-annular ligament, which I have laid open this morning, and the back of the perforatus tendon there is a synovial sheath; and my view of curb is this, that it is the result of an inflamed condition of the portion of that synovial membrane, and in consequence of that inflammatory condition an exudation takes place that produces the enlargement. That other structures become involved I have not a doubt. I have seen cases of curb where the inflammation has extended to the tendons, and even gone down to the bones; but I am speaking now of a curb *per se*, a curb of itself, not involving any other disease. I do not know whether you would like me to say anything about the causes which give rise to curb. They are as well known to you as to me. If you go on to the treatment of the malady, there is nothing like the firing-iron followed up with blisters, and Dame Nature assists us much in bringing about recovery. I have not the slightest doubt that it is due to an inflamed condition of the synovial membrane which allows of the easy play of that tendon on the surface of the post-annular ligament. This has wakened up in my mind a thought, while I have been in this room, that is worth consideration, though I do not ask you to discuss it. I very much doubt in my own mind whether a sprain of the tendons in the forelegs is anything more or less in ordinary cases than an interference with the sheath between the perforatus and the perforans tendons These tendons are made to move in apposition with each other, and allowed to do so by means of these synovial sheaths; and I can easily understand that if by any extraordinary exertion the tendon gets the least bit off, the interference will give rise to inflammatory action. Why is it you do not get recovery in these cases, at all events, only seldom? Because you have lost the gliding surface. The material which has become inflamed and thickened is gone. Any question you may like to submit to me I shall be glad to hear. If you will only discuss the matter and show me where I am wrong, or if you will introduce any other theory, I shall be happy to deal with it.

Captain Russell: Will you offer an opinion as to the qualification of soundness in curb?

Professor Pritchard: I should say unsound, most decidedly.

Mr. Gresswell: Is it hereditary?

Professor Pritchard: I do not believe it is hereditary. A horse with hocks predisposed to curb will breed horses predisposed to curb.

Mr. Mackinder: I knew a horse that had curbs, and almost every horse got by it had curbs.

Professor Pritchard: I should like you to give us your idea why a horse with a curb should breed his stock with curb. I do not say it is not so, but I should like to have an idea why it is so.

Mr. Mackinder: A thorough-bred horse called Montaguard travelled in my district, and every horse that he got had curbs. I cannot see, if curb is hereditary, how it can be entirely due to the inflammation of that small sheath.

Professor Pritchard: That supports my argument.

Mr. Mackinder: I should like you to explain why it is hereditary.

Professor Pritchard: I do not believe it is. I said so.

Captain Russell: I am sure we are all very much indebted to Professor Pritchard for coming down to see us at any time, and especially on this occasion to lecture to us on the subject of curb. Curb is a sore subject with many of us and many of our clients, whatever may be the cause of it. Some hunting men will tell you that if a horse has a curb, and is not lame, he is sound, particularly if he has got him to sell. Another man will tell you that he cannot be sound. My own opinion is, that if a horse has a curb or any other defect which renders him imperfect, he cannot be sound. I have heard this theory of Professor Pritchard before, and have given it a good deal of thought, for this reason: I have at home a specimen of ossification of a curb. That specimen most clearly denotes that the tendons were not implicated, otherwise the tendons would have become ossified too, but there is a hole where the tendons had to pass. The whole of the post-annular ligament would have been implicated. In the specimen, the point of ossification does not exist for more than an inch in length. I have been thinking, since Professor Pritchard has been speaking, whether that would tend to prove his assertion. The dimensions of the synovial sheath are probably an inch to an inch and a half in length, The post-annular ligament is four to five inches in length. Is this a specimen of ossification of a curb? I found it in a knacker's yard, and took it home and preserved it. I have an idea as to the point raised by Mr. Mackinder with reference to curbs being hereditary. I am open to conviction, but my idea is that where you see a stallion with a curby hock, and he is the sire of animals with a curby hock, you have a malformation of the bones of the hock projecting behind, which gives the appearance of curb,

and is not genuine. I should like to know whether an examination has ever been made of one of these horse's hocks to prove that it is a case of curb. There are many foals we see, year by year, that are roughly pulled away from the mare with twisted hind legs, and projections at the seat of curb, which after a time, in the course of four or five months, as the foal grows up, go back again, and the foal gets a straight leg. Why should not that be a curb? These things require thought and discussion to thrash them well out, and whether it will ever be decided in Professor Pritchard's time, whether he is right or whether Percival or Professor Williams is right, I am not in a position to say; but I must say for myself that I am strongly of opinion the Professor is on the right lines.

Mr. Goodall: I am much interested in the paper Professor Pritchard has given us on curb. For a long time I have had my own views on curb, and am convinced it is not cuboid or annular ligament. I must confess I have been at a loss as to the exact seat of curb. If it is a good hock, we consider it all right; but curbs on bad sickle hocks we do not know what to do with. They bother us a good deal. From what Professor Pritchard has told us to-day, I am quite willing to endorse his opinion, and shall certainly look into every curb I can get hold of in future. It is difficult to get hold of a hock for dissecting purposes with a curb upon it. In ordinary cases of breakdown we have not the opportunity of making a *post-mortem* quick enough after the accident to get the right knowledge as to the seat. As regards curb being hereditary, if you ever get a horse with a sickle hock, it may perhaps work a long time. We see some horses with sickle hocks that have no actual curbs upon them; but if they do come, they are generally the most trouble. Professor Pritchard was talking about the metatarsal bone. Only last week, at the repository, there was a mare which I knew was hard-worked, and which I knew was sound, with an extraordinary enlargement of that bone in both hocks, and from one point of view it looked as big as a pigeon's egg. I passed it without the least hesitation, though there was a great difference of opinion as to whether it was curb or not.

Mr. Gooch: I was pleased to hear the last remarks of Professor Pritchard as regards the soundness or unsoundness of curb. It has influenced me a great deal as a young practitioner. Some of us are called upon at local shows to disqualify horses for prizes. I have been in that position. A certain horse was deemed by the judges to be the superior animal of his class, but each of the judges thought it had curbs. I was called in to decide the matter, and found him unsound, as suffering from curbs in both hocks. I am pleased to hear that Professor Pritchard would have done the same thing under similar circumstances. As regards the outer metatarsal, I believe the protuberance is larger in some cases than in others. I once had to examine a Clydesdale horse in Derbyshire. In the Clydesdales the bones are much

more prominent than in other breeds. This horse has exceedingly prominent bones. I certified him as sound. A month after I was called in by the owner, who said a friend had told him the horse was suffering from curbs. After I had explained to him what it was, he was satisfied.

Mr. Hartley: I for one must add my testimony of thanks to Professor Pritchard for the lucid exposition he has given us as to the exact seat of the disease. What occurs to me is how far our discretion can go in such cases except malformation. In this county, if I rejected unconditionally every animal that has a curb or curby hock, I should neither be bringing satisfaction to myself nor to my employers. There are lots of horses I know to-day doing good work and taking their turn. Personally, I agree with Mr. Goodall as to the shape of the hock and as to the animal's general condition. I find, if you have got a horse that has had a really good hard preparation, and goes sound after severe exertion, and his hocks are not bad sickle-shaped hocks, that you may be safe in saying that the animal is practically sound and not technically sound. I look upon curb as technical unsoundness.

Mr. Smith: I am afraid I am in the same condition as other gentlemen, and hardly in a position to discuss the anatomy of the subject; but as far as meeting curbs in every-day life goes, I am decidedly of opinion that a curb is unsoundness, though for my own part, in a horse five or six years old, in condition, I would rather have a horse with a good curb than a horse with curby hock. I think these are almost distinct conditions. We frequently see cart foals with bad curby hocks that grow to be quite sound hocks. For my own part, a horse with good hocks, and good in other parts, if he were in good condition, I should recommend the purchase of—of course mentioning that he was unsound. I should not expect him to go unsound, however.

Mr. Dickinson: There is one condition of the hock which bears out Professor Pritchard's idea of curb, and that is the condition known as sprung hock. I have known horses while ridden and driven suddenly go lame. They are brought home, and the hock is found intensely swollen, hot, and painful. The usual treatment of lotions and physic is adopted. I have seen a case where the exudation rapidly disappears, and in the course of a few years leaving a confirmed curb. I agree with Professor Pritchard's idea of curb, and think that one condition bears it out fairly well, practically.

The *Chairman:* Professor Pritchard evidently wished the discussion to turn upon the fact as to whether the theory he has advanced is right or not. As one who learned anatomy under him, I am quite content to take his opinion, not only because of that, but because I cannot advance any argument against it. I have heard him say that curb is unsoundness. There is not the slightest doubt it is, legally so. Practical men will agree with me that we have to examine horses that have curbs, and if

we rejected all, we possibly should not have any horses to examine at all. I for one am of opinion that if a horse is five years old and has a curb on a good-shaped hock, we need have little or no fear in passing it. A horse with a sickle hock would not stand work in our country for three months. As to the enlargement of the outer small metatarsal bones, some two or three years ago I was sent to the extreme end of South Wales to examine a valuable horse, and was particularly requested to be careful about the hocks. On going to the stables, my eyes naturally rested on the hocks first, and my impression was, that the horse had about the worst curbs I saw in my life. I made a careful examination, and came to the conclusion that it was not curbs at all. This horse has been in our country for three seasons, and is perfectly sound in his hocks. Since then I have examined two or three more, and they are practically the same.

Professor Pritchard: You have all been so lenient with me that there is very little to reply to, for most of you seem to have adopted the theory I have laid down as to what a curb really is. There are one or two remarks, probably, I should make in reply to what has fallen from Mr. Mackinder and Mr. Gresswell. I am at a loss to know why curb should be hereditary—if it is, the theories that have been advanced go to the winds. They have been advanced from 1700 to the present day, and no one says anything about curb being hereditary. The seat of the mischief, and everything said with regard to it, must be wrong. If it is hereditary, it cannot be a sprain of the calcaneo-cuboid ligament; it cannot be a sprain of the perforatus tendon; it cannot be a sprain of either of the two sheaths I have spoken of. I have been trying to fish out some idea or opinion why it should be hereditary. I can understand a horse with such bad hocks, commonly called sickle hocks, which, from excitement of leaping about as yearlings in the pasture, will produce curb. I have thought whether there might be a rheumatic tendency in the animal; but even then it would not appear always in the hocks. As to the question of soundness and unsoundness, you may take it from me that a horse with a curb is an unsound horse. I am speaking now from an authoritative position—I do not mean as being Professor Pritchard, but from having come in contact with a great deal in connection with these matters, and having had the benefit of the judgment of other people who have had experience in such matters. I do not care whether he has a good or a bad hock. If he has a curb he is an unsound horse.

Captain Russell proposed that Professor Pritchard be elected an honorary member of the Association.

Mr. Hartley seconded, and *Mr. Gooch* supported the motion, which was carried.

Professor Pritchard: I am obliged to you for having so unanimously elected me a member of your esteemed Association. This is an honour I did not expect. It falls to my lot, fortu-

nately, to be an honorary member of several associations in the country, honours which I hope I thoroughly esteem; but I have long had an idea that the Lincolnshire Association was one of the best in the country, and to be elected one of your honorary members has almost taken the voice from me. I can say, with Shakespeare, "I am poor in thanks, but I thank you."

On the motion of *Mr. Mackinder*, seconded by *Captain Russell*, the resignation of Mr. Howse, of Lincoln, was accepted with regret.

Mr. Gooch proposed a vote of thanks to Professor Pritchard for coming amongst them and giving such an able address.

Mr. Goodall seconded, and the motion was carried.

Professor Pritchard. I offer you my best thanks for the kind manner in which the vote has been proposed and carried. I can only add to that, that if at any future time I can be of any use to the Association, you have simply to command me.

It was resolved, on the motion of *Mr. Hartley*, that the next meeting should be held at Peterborough.

Mr. Mackinder proposed, *Mr. Gresswell* seconded, and *Mr. Hartley* supported, a vote of thanks to the Chairman. Carried.

The *Chairman:* I can only tell you that it gives me the greatest pleasure to do all I can for the Lincolnshire Association.

F. L. Gooch, *Hon. Sec.*

LANCASHIRE VETERINARY MEDICAL ASSOCIATION.

The usual quarterly meeting of the above Association was held at the Blackfriars Hotel, Manchester, on Wednesday, December 11th. Tea at 5; business at 6.

Present—E. Faulkner, President; William Hunting, London; Messrs. T. Hopkin, Peter and W. A. Taylor, Thos. Greaves, W. Dacre, J. Moore, W. Hall, and Peter Pike, all of Manchester; R. C. Edwards, Chester; W. Whittle, Worsley; Thos. Briggs, Bury; E. S. Gubbin, Glossop; W. Wood, jun., Wigan; G. G. Mayor, Kirkham; H. Ferguson, Warrington; Thos. Dobie, Birkenhead; J. B. Taylor, Ashton-under-Lyme; Jos. Abson, and J. T. Thompson, Sheffield; W. H. Bridge, Bolton; D. Charnock, Aintree; Jas. Charnock, Melking; Jos. Urmson, Bolton; George Howe, Buxton; and S. Jackson, and the Secretary, Liverpool.

Letters of apology for non-attendance were received from Professors Williams, Walley, M'Call, and Axe, Messrs. H. Kidd, R. C. Trigger, W. Noar, Jas. Hart, and R. Hughes.

The *Secretary* read the circular convening the meeting.

The minutes of the last meeting were read and confirmed.

Mr. Joseph Abson nominated for membership Mr. J. T. Thompson, F.R.C.V.S., of Sheffield.

It was proposed by *Mr. John Moore*, seconded by *Mr. W. Hall*, that Mr. George Howe, M.R.C.V.S., of Buxton, be elected a member of the Association. (Carried.)

A letter was read from Mr. John Moore, tendering his resignation on account of his entering the Army Veterinary Department. The resignation was accepted with regret.

A letter was also read from the relatives of the late G. H. Darwell, of Northwich, thanking the members for their expression of sympathy under their recent bereavement.

It was proposed by the *Secretary*, seconded by *Mr. Whittle*, that a letter of condolence be sent to the father and relatives of the late George Ellison, of Chorley.

A letter was read from Professor Walley on the subject of tuberculosis being included in the Contagious Diseases (Animals) Act, and also the inspection of meat, but it was the unanimous wish of the members that Professor Walley be communicated with, with the object of inducing him to attend a meeting of the Association to lay his views down at greater length. This was put in the form of a motion by *Mr. Peter Taylor*, and seconded by *Mr. Thos. Greaves*, and carried unanimously.

Mr. Peter Taylor and *Mr. Thomas Greaves* then gave a detailed account of their visit to the practitioners of Liverpool with the object of attaining their better attendance at the meetings of the Association, and it was afterwards proposed by *Mr. W. A. Taylor*, seconded by *Mr. W. Whittle*, and supported by the *President*, that a hearty vote of thanks be accorded to both for their kind efforts.

The election of officers for the ensuing year then took place.

Proposed by *Mr. T. Briggs*, seconded by *Mr. Whittle*, that Mr. W. A. Taylor be elected President, which was carried unanimously.

On the motion of *Mr. Peter Taylor*, seconded by *Mr. T. Greaves*, Messrs. W. Woods, jun., Wigan, and Arthur Leather, Liverpool, were elected Vice-Presidents.

Proposed by *Mr. Peter Taylor*, seconded by *Mr. T. Briggs*, that Mr. T. Hopkin be re-elected Treasurer. (Carried.)

Proposed by *Mr. P. Taylor*, seconded by *Mr. W. A. Taylor*, that Mr. Peter Pike be elected Secretary. (Carried.)

Proposed by *Mr. T. Hopkin*, seconded by *Mr. P. Taylor*, that Messrs. John and Alexander Lawson be appointed Auditors. (Carried.)

Proposed by *Mr. Whittle*, seconded by *Mr. P. Taylor*, that a hearty vote of thanks be accorded to the office-bearers for their services during the past year. (Carried.)

Proposed by the *President*, seconded by *Mr. T. Hopkin*, that the usual dinner committee be appointed.

The following paper was then read on "The Treatment of Wounds," by William Hunting, F.R.C.V.S., of London:

I accept, generally, the doctrine that the principles of pathology are applicable to all animals having a similar anatomical structure. Inflammation is the same process wherever found, and fever pre-

sents no differences in the domestic animals other than are found in man. We veterinarians are therefore able to adopt and apply all the broad principles accepted by the human surgeon. Of course we accept them rationally—not as mere imitators—and we hope and believe that our experience is, in some things, of use to them and worthy of their acceptance. But the physiological and pathological actions which are seen in man vary to some extent in individuals as the result of internal and external conditions. Sometimes idiosyncrasy, sometimes previous disease modifies the pathological changes. The hæmorrhagic diathesis, for instance, affects the healing of wounds, and syphilitic infection alters the phenomena of many diseases. Insanitary surroundings also add to the surgeon's difficulties, and too often convert a simple condition into a dangerous and complex one. In the lower animals we are less troubled by idiosyncrasies and morbid taints, but we have other difficulties to contend with. We cannot order or maintain certain favorable conditions of the patient, we cannot ensure quiet and rest, we cannot always guard against injury to a painful part by the animal itself, and we cannot arrange the sanitary appliances and surroundings as we should wish.

On the other hand, the sheds and stables in which our patients are treated are generally free from the septic conditions sometimes found in hospitals and occasionally in houses. We seldom have much to fear from shock, and still less frequently have we to combat the nervous depression and irritability due to mental conditions.

There is then sufficient difference between human and veterinary surgery to warrant us in discussing pathological questions without fully accepting the practice of the sister profession.

This, gentlemen, is my apology for coming here to discuss the subject of the treatment of wounds with some doubts as to the value of the usual aseptic methods. Our practice, following in the wake of human surgery, seems to have very widely adopted asepticism as the great fundamental principle in treating wounds. I do not wish to deny the importance or the truth of the great principles worked out so ably by Sir Joseph Lister, but I incline to believe that they are not so requisite in veterinary surgery as in human, and I am doubtful if many of the methods of applying them are not very imperfect and sometimes the cause of ill effects as serious as those they are employed to prevent.

The argument, as I understand it, is this—The very worst thing in or on a wound is a germ ; the air is full of germs, the surface of the skin is covered with them, all materials that may come in contact with a wound have germs in or on them. Therefore disinfect the wound, disinfect the air, disinfect all fluids and solids which must or may come in contact with the wound. Now I take exception to this argument—I deny that all germs are injurious to a wound, and I do not believe that injurious germs are frequent in the air or common on all sorts of material. The air may, for all I know, be as full of germs as the earth is full of seeds. I am con-

vinced all the seeds are not poisonous (many are beneficial), and I am inclined to believe that nearly all the germs in the air are harmless. It may be replied that no one has said they are *all* harmful; that the precautions of aseptic treatment are only directed against the few which may exist and which cause such grave mischief when they are present—mischief so grave that it behoves us always to guard against even the possibility of their existence.

To this I say that when human life depends upon the result no chance should be thrown away, but it should be carefully considered whether the methods adopted to guard against a possibility do not entail certain disadvantages. The results of aseptic procedure in human surgery seem to indicate that it does protect from great dangers, and that its disadvantages are very slight. Many operations are now performed with safety that a few years ago were too frequently followed by fatal results. Is this entirely due to asepticism? May it not depend upon improvements in other surgical details? These questions I cannot answer; but I doubt whether our patients can be made to experience the same improvement in the healing of wounds by our more widely and thoroughly adopting the principles of Listerism.

What we require in veterinary practice is rapid healing of a wound, no blemish that can be avoided, and as little interference with the future function of a part as possible. These desirable conditions are interfered with by many events over which we have no control. There is in all wounds a natural tendency to heal, but Nature does her surgery without any consideration for time or loss of work, with no regard to blemish, nor even to future impairment of function. It is our duty to guide the process, and to remove anything which interferes with its progress. Accidental wounds, which form the bulk of our practice, are frequently not brought under our notice till long after they have been inflicted. They vary in degree and in kind as much as they do in position. The smallest incised wounds and the most complex injuries come under our notice at all stages; sometimes quite recent, at others after days of the grossest maltreatment. Before considering these, it will perhaps be more convenient to consider those surgical wounds which we deliberately make and which we have, to some extent, under our control from start to finish. In castration and spaying we have examples of wounds inflicted on important structures, and it is worth noting how seldom they are followed by any dangerous complications. Probably no one ever saw them done under strict aseptic rules; and yet what evils have we ever traced to germs in them? No wounds are supposed to be more dangerous than those opening into the abdomen. Thousands of pigs are every year laid on their backs, an opening made into the abdomen, a finger inserted, the ovaries pulled out and removed, the wound stitched up, and not one single antiseptic precaution taken, either with the patient's skin, the operator's hands, or his knife and sutures. The fatality is not more than one per cent.

Colts, calves, lambs, and cats are castrated by the thousand without the least care for germs—and how many die? The percentage of loss could only be stated in fractions. Then look at the tumours that are removed with no aseptic precautions. Healing by first intention is common enough, and when absent may generally be easily accounted for without any supposition that micro-organisms have prevented it.

In the case of spaying, although no antiseptic precautions are taken, there is one condition always observed by the most successful operators, viz., withholding food for twenty-four hours previously and for some time after. My own small experience leads me to believe that this is a most important detail, though I can offer no explanation as to its action.

In the case of castration nearly all our losses are *traceable* to two causes—hæmorrhage and swelling. The first I think is only the result of negligent surgery, and the latter never results except when the animal is tied up and prevented from moving about.

In the case of tumours we fail to obtain healing by first intention, or by adhesion as the result of one or two very simple conditions. Perhaps I had better say here that I recognise no difference in the processes described as "first intention" and "adhesion." They are essentially the same, and consist in the union of the sides or lips of a wound without granulations or without any new tissues being formed between them. When a tumour is large, its removal leaves a wide gap in the tissues, and it may be impossible to approximate the two cut surfaces without considerable stretching. Of course if they do not approximate they cannot adhere. When stretching is great, the sutures may "cut out" and the wound gape, or the animal may rub them out. The cause of non-union is the purely mechanical one of want of contact. The shape of the wound may also be a cause of failure. No one can bring the surfaces of a basin-shaped wound into complete and equal apposition; it must be elongated at the expense of some sound tissue at each end, and then we obtain two nearly flat surfaces, which may be properly brought together with tolerably even tension throughout. Another cause of failure to obtain adhesion is too great haste to finish the operation, resulting in blood being left in the wound. All vessels should be tied or twisted, and capillary oozing checked by cold water and sponging. The very best results follow when the wound is allowed to become nearly dry before being closed.

Some years ago a pony was brought to me with a wound on the alæ nasi. A hook had penetrated the alæ, the pony ran back and tore it out, leaving the two sides separated for nearly three inches. A farrier had, two or three days before I saw it, sewn it up with four string stitches, leaving the edges of the wound dry, thickened, and not united anywhere. I cast the pony with the only available tackle (a cart rope) and pared a thin slice from each lip of the wound. At this stage the pony by struggling got so loose that I was obliged to let him up and re-cast him. I remember thinking

my re-vivified edges would get dry and that the delay would spoil the operation. The wound was closed with pin sutures, and the patient was to have been brought back in three days for inspection. I did not see it till the seventh day when the owner was passing. Every pin had cut itself out, leaving a transverse line, and the wound was healed throughout. A few months after no trace of the injury was visible. This first taught me never to hurry, but to wait until bleeding ceased, and to expect the best results from closing a wound when the surfaces showed no blood but only that glazed condition due to exudation of lymph.

Another instructive case I venture to relate. A grey horse at grass was found one morning with a transverse wound across his ribs. It was a clean cut, and was thought to have been maliciously done with a knife. It was just over two feet in length, and gaped at its widest part about nine inches. The tissues were very mobile, not a drop of blood was in the wound, but it had one nasty feature which I thought might give trouble. The muscular tissue under the skin was cut through, and the muscle had retracted. When the parts were put together just to see how they met, it was found that the incision in the skin was at a level three inches higher than that in the muscle. Waxed linen thread was used to close the muscle-wound, and the ends of each suture brought out of the skin-wound. The skin was brought together with pins. In six days most of the pins had cut out, one of the thread sutures was gone, and adhesion had taken place throughout. The wound sloped downwards posteriorly, and at its extremity a small abscess the size of a walnut had formed; this was opened, and healed rapidly. When I saw this wound it had been done four hours at least, and possibly seven or eight. Exposure to the air had done it no harm. Whatever organisms existed in the air must have been very harmless, or we could not have had such an extensive surface heal at once by adhesion. In this case too, like the other, all bleeding had ceased, and we had the condition which I consider most favourable to rapid union. This patient, I have said, was in a field, and it may with much force be argued that the air surrounding him would be the the least likely to contain any injurious organisms. The air in stables does not of itself seem injurious to wounds. We all have seen cases in which an incision or tear of the skin inside the elbow has been followed by emphysema to such an extent as to distend the skin and subcutaneous connective tissue all over the region of the neck, shoulder, and part of the thorax. Such cases, with no aseptic treatment, soon recover, and I never saw the slightest untoward symptom result.

The healing of wounds made in the operation of neurotomy teaches us at least two points. A few years ago these wounds were treated by wet bandaging, and no healing by adhesion ever resulted. The openings gaped, and were filled up by granulation to such an extent that in most cases very evident scars were left. Now that dry dressings are resorted to, healing is very rapid, and blemishes, if even they exist, are very small.

In my experience the worst complication we meet with is swelling of the legs. This effectually prevents all healing by adhesion, and very often causes the wounds to gape and discharge for a long time. All wounds on the lower part of horses' legs may meet with this great disadvantage. Swelled legs are most common, and one great cause is tying the animal up in a stall. With wounds on legs we naturally desire to avoid the stretching effects of motion and the still more forcible injuries resulting from the animal lying down. We try to prevent these by tying it up, and then we incur the equally great disadvantage of swelling. In fact, I think swelling of legs which are wounded is the greatest interference we have to fear, and, unless the wound be directly over a joint, I always advise a loose-box. No treatment of wounds of the extremities can be very successful which does not guard against swelling or, should it exist, which does not at once endeavour to remove it. Perhaps in no case is the retarding effect of swelled legs upon a wound better seen than in ordinary cracked heels. If the skin be thickened by exudation in it and under it, no treatment seems effective in promoting healing. If we reduce the swelling—and nothing does this so well as exercise—healing at once sets in and progresses favorably.

So far my remarks have been suggested chiefly by my experience of incised wounds, and the lesson I think they teach is that we need not alarm ourselves about the possibility of septic infection. If we obtain healing by first intention or adhesion, we shall certainly have no septic trouble. We can, I hold, get this by a few ordinary precautions.

1. Do not close the wound until bleeding has ceased, and if necessary wait a few hours for this. In many cases, although a little oozing of blood is still proceeding, the mere pressure of bringing together and retaining the cut surfaces will check further flow.

2. Shape your wound so that no cavities are formed by the two surfaces not being in contact.

3. Let the coaptation of the surfaces of a wound be as exact as possible.

4. Secure them firmly and closely.

5. Avoid all heat and moisture.

6. Anticipate and prevent swelling.

The fifth precaution—avoid all heat and moisture—is the one which I say used to be neglected in neurotomy when wet bandages were used. Now this is the great objection I have to most methods of applying aseptic or antiseptic treatment. You cannot retain dressings on a wound unless they are kept in a position by cloths or bandages, and nearly all dressings are liquid. Immediately you wrap a wound up you keep it warm and moist, and this is a condition amongst the worst for rapid adhesion. It is perhaps argued that heat and moisture are only evils to a wound because they favour the activity and increase of micro-organisms, and that if the part be kept surrounded by antiseptics, no organisms can exist. I

believe that heat and moisture are bad in themselves, that they injuriously affect the nutritive changes of the part, and damage the physiological process of healing. When we, by retaining heat and moisture around a wound, form just the very best state for the existence and growth of organisms, we must use our antiseptic dressings of as great strength as the risk of poisoning will allow. Now many of these dressings that are strong enough to kill outside organisms are also strong enough to kill the living cells without which repair cannot go on. Such risks are warrantable in an atmosphere where septic infection is known to exist; but I do not think that in veterinary practice our patients or their surroundings are in a condition to require any course of treatment for wounds which entails so many disadvantages, and which in practice is shown so generally to be unnecessary.

I may perhaps here be allowed to say a few words as to the best methods of closing wounds. I have tried many kinds of sutures, but for some years past have used nothing but pins and skewers, with a figure of eight twist of cotton cord round them to hold the lips of the wound in apposition. I do not have them made of steel, as that metal rusts. I use ordinary blanket-pins varying in length from two to three inches for most wounds, ordinary small pins for the smaller wounds, and kitchen skewers (tinned or galvanised) for the largest. All pins are now tinned, and leave a wound after a week or more quite bright. When they are in position I remove the points with a pair of cutting forceps. Pins do not cut out so quickly as wire sutures, and are quite innocuous in a wound. When I find a pin cutting itself out too rapidly I place a larger one alongside of it and remove the first one. In large wounds it is advisable to take a very wide hold of the tissue—perhaps two inches from the edge of the wound. In such cases I always put small pins through the immediate edge to prevent any gaping.

The accidental wounds which come to us for treatment present greater difficulties than the clean incised wounds we make ourselves. They are often bruised and torn, sometimes masses of skin or other tissue are removed, and not unfrequently their form or position renders it inadvisable to close them at once. Some of the very worst wounds we see are in cases of broken knees—a large portion of skin is entirely removed, the surrounding tissues are bruised, the denuded structures are torn and jagged, whilst grit and dirt is literally rubbed into their structure. We may be certain that a great deal of swelling will follow, movement makes them worse and a synovial discharge may come from the sheath or the extensor metacarpi, or even from the joint itself. In such a case, what is the best procedure? I hold that the safest practice is to make up your mind what is the worst complication likely to arise and set to work to anticipate it. We may perhaps decide that intense inflammatory action will arise and cause the wound, which at present has not opened any synovial cavity, to be complicated by an escape of synovia. For such cases I employ continued cold water irrigation.

When bruising, pain, and swelling are the most to be feared, I trust in warm water. When the injury is more superficial, I use carbolised oil.

There is a position where wounds in my experience are specially liable to have no depending orifice, and in which exuded fluids are prone to collect, *i. e.* just in front and below the angle of the ileum. Tears and cuts in this region, even if the agent causing them does not penetrate downwards, are liable to form sacs owing to the looseness of the tissues allowing fluids to gravitate between them. Without a depending orifice be made, they heal badly, and I need hardly say should never be sewn up.

In muscular regions of the body, lacerated wounds often so damage tissues that it is important before closing them to form a correct opinion as to vitality of the parts. Shreds of tissue may be so isolated or crushed as to have no chance of reviving, Should they die in the closed wound, healing is impossible. Such damaged portions should be removed with as great care as clots of blood or distinct foreign bodies. I remove them usually with scissors, and snip off piece after piece until I make a cut from which blood flows. So long as no bleeding follows a cut I consider the tissue incapable of restoration. Perhaps I should make an exception in favour of skin. I never remove strips of torn skin from a recent wound but carefully replace them in the best position I can. Even if they do not adhere, they are a protection, and can be cut away when their non-vitality is quite assured.

With accidental wounds then we have further conditions which interfere with the healing process. We have the probability of portions of dead tissue or of such injured structures that their recovery is impossible. We have cavities which can only be filled up by granulations, and which may retain collections of fluid. We have the formation of pus which need not be feared so long as it remains normal. We have in fact conditions where septic infection is to be feared. It is when we have fluids in a wound that organisms become mischievous. Serum, blood, pus, if allowed to collect, are dangerous. They must be allowed to escape, and when we cannot get rid of them as quickly as they are formed we use disinfectants to prevent them becoming septic. Agents that are dry I prefer, such as powdered boracic acid or mixtures containing iodoform, or corrosive sublimate, or salicylic acid. Next to those I like antiseptics dissolved in oil. Of course to wash out large cavities aqueous solutions must be employed; and no agent gives better results than permanganate of potass.

Extremes of heat and cold add to the difficulties of treating wounds. In India we are told that septic infection is greatly to be feared. In Canada during the winter months injured parts die rapidly from the cold, and wounds of the extremities are especially dangerous. In this climate we have not much to fear from the infrequent extremes of temperature, but we must not lose sight of the fact that cracked heels are chiefly of the nature of chilblains, and that in winter, wounds below the knee and hock may well be pro-

tected by some non-conducting covering—flannel bandages and cotton wool for choice.

Now, gentlemen, I have, I think, said enough to initiate a good discussion. The chief point I insist on is that careful detail is, in the treatment of wounds as in every other operation, the most important factor to ensure success. I am open to correction if I have formed an erroneous view of the danger of septic infection. I hold we should, whenever practicable, endeavour to obtain healing by first intention, and that our observations should be directed to detecting what retards and what facilitates that process. I am not at present inclined to allow that promiscuous organisms do much harm to wounds, and I do not think we find many special organisms with infective properties in the conditions which surround the lower animals. If this be so, we need not adopt all the tiresome minutiæ of aseptic surgery, and we need not allow the absolute impossibility of applying it in many cases to cause us any vain regrets. On the other hand, if I am wrong, I shall conscientiously revise my surgical practice.

Mr. Peter Taylor opened the discussion by extending to the essayist his warmest thanks for coming so far and reading them so good a paper. He did not, however, agree with it all, and he missed from it much that he should like to have heard discussed—notably, the treatment of wounds of the foot. He confessed that the treatment of wounds had much advanced since his early days. He thought they were deeply indebted to Lister for his great work, and he should not lightly coincide with the essayist in disapproving of it. There were two distinct methods of treating wounds—the dry and the wet treatment, but both had for their basis asepticism. He noticed that Mr. Hunting did not believe in germs, but he used carbolic and boracic acids.—Why? The treatment of simple wounds was an easy matter, but wounds of the thorax and abdomen were always serious, and some of them simply frightful. It was in these cases the practitioner required all his skill and every assistance that science could offer.

Mr. Taylor related cases which he had seen, and described fully a case in which he had to cast a horse and with great difficulty return a mass of protruding intestine ; the wound was sewn up and merely dressed with Friar's balsam, but to his astonishment it made a perfect recovery.

Mr. Greaves had had considerable experience in the treatment of all sorts of wounds, and came to the conclusion that the majority did best under an antiseptic dry treatment. He felt certain Mr. Hunting was correct in his ideas, but he knew some practitioners who treated broken knees with nothing but cold water, and they claimed to be very successful. He used mild astringents, and lately had largely employed corrosive sublimate in solution, which he found to be an excellent disinfectant. He had been much pleased with the scientific and practical paper, the general principles in which he endorsed.

Mr. Whittle had also been much gratified in listening to the

paper. He agreed with the treatment there laid down, and would like to see the author more often amongst them.

Mr. Edwards said it was his practice to treat wounds very simply. He related two cases of wounds penetrating the thorax, in each of which the injured parts felt icy cold, and the patient soon died. He would like to know what was the significance of this cold feeling? He did not much believe in stitching up flesh wounds. He found they healed up well when let alone and gradually contracted to their proper form. He never adopted warm fomentations to wounds, and generally used boracic acid or a solution of Ol. Eucalypti applied with a feather.

Mr. Dacre had been very much interested in Mr. Hunting's paper, with which, on the whole, he agreed. He considered that too much was often done to wounds. He used sublimated wood wool as dressing, and related a case of a dog whose foot was run over and crushed. The treatment consisted in wrapping it up in the wood wool, and recovery took place without a bad symptom. The parts were excluded from the air, and the dressing was perfectly absorbent and antiseptic. He had had most successful results in cases of extensive injuries on horses by keeping the part covered by a carbolised curtain, which was a method of keeping the wound and the air surrounding it free from any septic evils.

Mr. J. T. Thompson confirmed the value of the treatment suggested by the essayist. He, however, believed in poulticing foot cases, as great relief was given by the softening of the horn.

Mr. Alson recommended the use of iodoform, which in his practice had given very good results.

Mr. Briggs thought antiseptics were of great value in wounds of serous cavities, and pointed to the grand results achieved in the human subject in abdominal surgery—results he thought unattainable until the aseptic methods were introduced. He felt a little disappointed that Mr. Hunting had not touched upon fistulous wounds, which were so common in veterinary practice and so often unsatisfactory in their termination.

Mr W. A. Taylor remarked on the wounds produced by castration, and differed from Mr. Hunting as to the cause of death. Neither hæmorrhage nor swelling, in his experience, were causes, but septic peritonitis was. He had confidence in asepticism, and adopted it as a surgical principle. He would just add that he considered the dragging of muscle which was entailed by using deep sutures in some wounds a great evil. When parts could be approximated without stretching the tissues, he brought them together, but not unless.

Mr. Hopkin did not altogether coincide with Mr. Hunting's opinion of antiseptic surgery. The operations now performed by human surgeons as reported every week in the medical journals were simply appalling. Their success was due to the careful antiseptic precautions taken, and would have been impossible in the days before Listerism had been accepted. He agreed with the previous speaker that septic peritonitis was the cause of deaths

following castration. Old castrators were most careful with their hands and instruments to avoid all contaminations. As to the operation of neurotomy, he avoided all the difficulties of treatment by sending the animal at once to work. The wounds then healed well and rapidly, and no swelled legs arose to interfere with the healing process. As to heat and moisture, they were bad for healing by adhesion, but they were useful promoters of granulation. Mr. Hopkin also referred to abdominal wounds and burns, the latter of which were most difficult and troublesome.

Mr. G. Mayor said that if Mr. Hunting were wrong he erred in good company, for Mr. Lawson Tait and the late Mr. Sampson Gamgee did not adopt any rigid or septic rules in their surgery, but both were most successful surgeons; in fact, Mr. Tait probably had no equal as a practitioner of abdominal surgery. He related a case of an upper eyelid of a horse which was nearly torn off, but which when sutured in its place made a perfect recovery. This he thought was due to it having been closed in the condition referred to by Mr. Hunting—after all bleeding had ceased and the surfaces covered by a mere coating of lymph.

Mr. Woods, jun., thought there was a danger of revulsion against asepticism, which, however, must be acknowledged as an important principle. He thought that a safe rule in the treatment of wounds was to decide what beneficial termination appeared nearest, and then to endeavour to attain it.

Mr. Hunting in reply thanked the members for the way in which they had discussed the subject. He had not meant to deny altogether the value of antiseptic treatment. He objected chiefly to those methods of employing it which necessitated the injured part being kept hot and moist by wrappings, and he wished to protest against it being accepted as more important than many details which assisted in promoting healing. He believed that all collections of fluids, either blood, serum, or water, should be prevented accumulating in or around a wound, and that without them no germs need be feared. Of course if we knew of the existence in or about a wound of septic conditions we must remove them or render them inert. He then rapidly and sometimes humorously replied to each speaker who had suggested objections to his paper, pointing out that it must necessarily be very incomplete. The subject was too large for exhaustive treatment; he only attempted to touch the broad principles and to attract a good discussion.

Proposed by *Mr. P. Taylor*, and seconded by *Mr. T. Greaves*, that a very cordial vote of thanks be accorded Mr. Hunting for coming such a distance to render them such service, and for the very excellent character of his paper. Carried unanimously.

The usual vote of thanks to the President terminated a very successful meeting. ARTHUR LEATHER, *Hon. Sec.*

THE NATIONAL VETERINARY BENEVOLENT AND MUTUAL DEFENCE SOCIETY.

The Veterinary Mutual Defence Financial Statement from January 1st to December 31st, 1889.

1889. *Cash Received.*	£	*s.*	*d.*
Balance in Bank Jan. 1st, 1889	438	2	5
Subscriptions in 1889	61	12	6
Bank Interest, June and December	8	5	4
	£508	0	3

1889. *Cash Paid.*	£	*s.*	*d.*
Paid for use of Room	0	5	6
Treasurer's expenses	2	5	8
Cash in Bank	501	2	9
Cash in hand	4	6	4
	£508	0	3

Audited and found correct,
JNO. B. WOLSTENHOLME.

THOMAS GREAVES, *Hon. Treasurer.*

January 13th, 1890.

The National Veterinary Benevolent Financial Statement from January 1st to December 31st, 1889.

1889. *Cash Received.*	£	*s.*	*d.*
Balance in Bank Jan. 1st, 1889	395	1	5
Cash in Mersey Docks	1900	0	0
Cash from Scottish Metropolitan Veterinary Medical Society	4	4	7
Sir F. Fitzwygram	3	0	0
Four Dividends from Mersey Docks	73	7	4
Bank Interest, June and December	7	7	4
	£2383	0	8

1889. *Cash Paid.*	£	*s.*	*d.*
Jan. 24th, Mrs. Rushall	5	0	0
April 20th, ditto	5	0	0
June 7th, Mrs. Freeman	5	0	0
July 23rd, Miss Orton	5	0	0
Dec. 31st, Cash in Bank	463	0	8
Cash in Mersey Docks	1900	0	0
	£2383	0	8

Audited and found correct,
JNO. B. WOLSTENHOLME.

THOMAS GREAVES, *Hon. Treasurer.*

January 13th, 1890.

List of Subscriptions to the National Veterinary Benevolent and Mutual Defence Society, 1889.

1889. January	£	*s.*	*d.*
Mr. Wm. Carless	0	10	6
— R. C. Trigger	0	10	6
— E. Nuttall	0	10	6
— H. W. Caton	0	10	6
— J. B. Taylor	1	1	0
— R. Reynolds	0	10	6
— W. Whittle	0	10	6
Professor Williams	0	10	6
Mr. Henry Thompson	1	1	0
— J. C. James	0	10	6
— John Freeman	0	10	6
— R. C. Edwards	0	10	6
— B. Cartledge	0	10	6
— F. G. Samson	0	10	6
— J. M. Axe	0	10	6
— J. D. Overed	0	10	6
— R. Cartwright	0	10	6
— F. T. Stanley	0	10	6
— G. Rugg	0	10	6
— H. J. Goodall	0	10	6
— W. H. Webb	0	10	6
— T. A. Dollar	0	10	6
— Finlay Dun	1	1	0
— H. Hogben	0	10	6
— W. F. Peacock	0	10	6
— E. Faulkner	0	10	6
— T. Danby	0	10	6
— J. Rowe	0	10	6
— T. G. Chesterman	0	10	6
— T. Collins	0	10	6
— C. Morgan	0	10	6
— Wm. Roots	0	10	6
— T. E. Anger	0	10	6
— Wm. Woods	0	10	6
— Henry Olver	0	10	6
— J. Storrar	0	10	6
— S. Locke	0	10	6
— J. H. Ferguson	0	10	6
— J. Bale	0	10	6
— G. A. A. Oliver	0	10	6
— Wm. Dobie	1	1	0
— T. Riddler	0	10	6
— J. Woodger	0	10	6
— T. Hopkins	1	1	0
— J. B. Wolstenholme	0	10	6
— T. D. Broad	0	10	6
Messrs. G. Ball & Son	1	1	0
— Batt & Son	1	1	0
January			
Mr. W. J. T. Bower	0	10	6
Professor Walley	0	10	6
February.			
Mr. F. Deighton	0	10	0
— T. Pratt	0	10	0
— E. Beddows	1	1	0
— W. Cawthorn	0	10	6
— H. Ferguson	1	1	0
— B. Russell	0	10	6
— J. W. Anderton	0	10	6
— T. D. Lambert	0	10	6
Messrs. Elam & Jackson	2	2	0
Mr. T. Secker	0	10	6
March.			
— A. L. Gibson	0	10	6
— T. Aubrey	0	10	6
— E. H. Leach	1	1	0
— C. Moore	0	10	0
Messrs. J. & A. Lawson	1	1	0
May.			
Mr. J. E. Scrivens	2	2	0
— J. S. Carter	0	10	6
— G. Schofield	3	3	0
June.			
— W. Darwell	0	10	6
— J. R. Cox	0	10	6
— A. Olver	0	10	6
July.			
— W. A. Field	1	11	6
August.			
Messrs. P. Taylor & Son	1	1	0
November.			
Scottish Metropolitan Vet. Med. Association	4	4	7
Mr. T. Greaves	0	10	6
— C. Sheather	0	10	6
— O. J. Hills	0	10	6
— C. Moir	5	0	0
Sir F. Fitzwygram	3	0	0
Mr. G. H. Pyatt	1	1	0
December.			
— H. R. Perrins	1	11	6
— J. L. Barling	0	10	6
— G. Newsom	0	10	6
	£68	17	1

Audited and found correct,
JNO. B. WOLSTENHOLME.

THOMAS GREAVES, *Hon. Treasurer.*

January 13th, 1890.

NEW MEMBERS OF THE PROFESSION.

At meetings of the Board of Examiners held in Glasgow and Edinburgh on and between December 12th and 17th, 1889, the following gentlemen passed their *Final Examination*, and were admitted members of the Royal College of Veterinary Surgeons:

Glasgow Veterinary College.

*Mr. H. Potts	Broomhill, Lanarkshire.
— J. McDougall	Helensburgh.
— C. J. Dunn	Glasgow.

New Veterinary College.

Mr. E. Franklin	Sheffield.
— G. H. Schofield	Manchester.
— T. H. Dale	Manchester.
— W. Dotchin	Newcastle-on-Tyne.
— D. McGregor	Tullypowrie, Perthshire.
— T. Eastwood	Manchester.
— R. C. Hughes	Denbigh.
— G. Stevenson	Stronsay, Orkney.
— G. Radcliffe	Oldham.
— F. D. McLaren	Beverley.
— E. P. Edwards	Mold, North Wales.
— T. S. Snarry	York.
— E. F. de Jong	Edinburgh.
— G. H. Scoon	Kelso.
— T. W. Barraclough	Bradford.
— R. W. Donaldson	Bridge of Allan.

Dick Veterinary College.

*Mr. J. Peddie	Edinburgh.
— J. Bell	Gateside, Cumberland.
— W. McQuatt	Kirkconnell, Dumfries.
— C. Deathe	Enniscorthy.
— W. Potts	Banbridge, County Down.
— J E. Miller	Sunderland.
— T. W. Rogers	Welshpool, Wales.
— G. Henderson	Edinburgh.
— C. Wade	Dublin.
— W. A. Young	Tullow, Carlow.
— W. H. S. Day	Portobello, Edinburgh.

* Marked thus, passed with *Great Credit*.

The following gentlemen passed their *Second Examination:*

GLASGOW VETERINARY COLLEGE.

Mr. J. Meikle.
* — A. Milligan.
Mr. F. J. Boyle.
* — R. P. Dalgleisb.

NEW VETERINARY COLLEGE.

Mr. J. Norbury.
— G. H. White.
— W. E. Sayles.
— L. Brown.
— W. Litt.
— J. A. R. Towers.
*Mr. R. J. Bushnell.
— W. G. Senior.
— O. A. Ducksbury.
* — H. E. Richardson.
* — A. J. Dalgleish.

DICK VETERINARY COLLEGE.

Mr. H. W. Squire.
— T. Condon.
— G. Best.
— R. Foreman.
— E. Carroll.
Mr. W. Cureton.
— J. Nolan.
— H. S. Clark.
— J. Mitchell.

The following gentlemen passed their *First Examination:*

GLASGOW VETERINARY COLLEGE.

Mr. H. McConnell.
— R. Mason.
— D. P. Harvey.
— H. L. Chambers.
Mr. H. Hazeel.
— T. F. Barton.
— A. P. Stewart.
— W. Crowley.

NEW VETERINARY COLLEGE.

Mr. J. M. Lund.
— G. W. Balfour.
— M. J. Carroll.
— T. Lanchester.
— W. O. C. Dawson.
— J. S. Gould.
— J. W. Martin.
Mr. W. Sime.
— N. Fraser.
— R. Taylor.
— F. T. Blakemore.
— J. A. Lyons.
— W. C. Patrick.

DICK VETERINARY COLLEGE.

Mr. L. P. Knight.
— H. Shaw.
— W. Elder.
— T. Durie.
— T. J. Foulkes.
Mr. J. Jones.
— D. Ritchie.
— T. Smyth.
— C. Hives.
— J. Mallow.

R. RUTHERFORD, F.R.C.V.S.,
Secretary, Board of Examiners for Scotland.

* Marked thus, passed with *Great Credit.*

ROYAL COLLEGE OF VETERINARY SURGEONS.

EXTRACT from *Section 5 of the Veterinary Surgeons Act*, 1881, which provides that:

"(1) The Registrar shall from time to time insert in the Register of Veterinary Surgeons any alterations which may come to his knowledge in the name or address of any persons registered.

"(2) The Registrar shall remove from the said Register the name of every deceased person.

"(3) The Registrar may remove from the said Register the name of a person who has ceased to practise, but not (save as hereinafter provided) without the consent of that person.

"(4) Where the Registrar has reason to think that any person registered has ceased to practise, the Registrar may send by post to such person a notice inquiring whether or not he has ceased to practise or has changed his residence; and if the Registrar does not within three months after sending the notice receive any answer thereto from such person, the Registrar may, within fourteen days after the expiration of the three months, send him by post in a registered letter another notice referring to the first notice, and stating that no answer thereto has been received, and if the Registrar does not within one month after sending the second notice receive any answer thereto such person shall for the purpose of the present section be deemed to have ceased to practise, and his name may be removed accordingly.

"(5) In the execution of his duties the Registrar shall act on such evidence as in each case appears sufficient."

List of Names of Members removed from Register through non-compliance with Section 5, Subsection 4, of the Veterinary Surgeons Act, 1881.

Abbot, Charles, late Manchester.
Allan, Ralph, late Coldstream, Berwick.
Allan, William, late Chesham, Bucks.
Allen, J. G., late Ramsden Road, Balham.
Allison, Jas. N., late Carmarthen.
Anderson, Alex., late Glasgow.
Anderson, G. R., late Middlesbrough, Yorks.
Ansell, W.M., late Featherstone Buildgs., Limehouse.
Archer, David, late Brecontree Heath, Essex.
Arthur, Robert, late Monkland Iron Works, Hereford
Attwood, Alex., late Lower Duffryn, S. Wales.
Baddeley, W. W., late Worcester.
Bagg, Alderman C., late Blackheath.
Bailey, Geo., late Shifnal, Salop.
Baker, H., late Halton, Cheshire.
Baker, H. M., late Liverpool.
Banister, A. E., late Bridport.
Barclay, James, late Perth.
Barker, John, late Bath.
Baldwin, Thos. C., late Bacton, Norfolk.
Balfour, Geo. H., M.D., late Edinburgh.
Barnes, H. J., late West Derby, Liverpool.
Barnett, John, late Plymouth.
Barton, Robt. Jas., late Tunbridge Wells.
Batchelor, A. H., late A.V.D.
Bicknell, Isaac, late Indian Army.
Bartrum, W. H., late Waterloo Road, Brighton.
Baty, Thos., late Stockton-on-Tees, Durham.
Baxter, John, late Drymen, Stirlingshire.
Bean, Nicholas, late Stockton-on-Tees, Durham.
Bean, Parrington, late Stockton-on-Tees, Durham.
Bell, R., late Winchester.
Bennett, A. B, late Edinburgh.
Bettison, J. E., late Newbury, Berks.
Bakeley, John, late Belfast.
Boden, Hesman, late Bermondsey.
Borman, C. E., late Waltham, Lincolnshire.
Borrowman, James, late Edinburgh.
Briggs, John, late Coventry, Warwickshire.
Broad, G, late Kentish Town, N.
Brown, J. H., late Lincoln.
Bruce, Neville, late Islington, N.
Bunbury, T. B., late Piccadilly.
Burbage, J. H., late Manchester.
Burd, B., late Liverpool.
Burnham, C., late Lincoln.
Buthman, J. E., retired A.V.D.
Buxton, James, late Manchester.
Buzzard, A. E., late Clay Cross, Derby.
Campbell, A., late Birmingham.
Capes, W., late Belvedere Road, Lambeth.
Carless, J. R., late Whitechapel.
Carlisle, W., late Wigton.
Carmody, W. T., late Brompton Road, Kensington.

Carter, Frank L., late Manchester.
Cattrall, J. G., late Burton Mews, Berkeley Square.
Cave, Geo., late Liverpool.
Chalmers, James, late Longton, Carlisle.
Charles, J. W., late Accrington, Lancashire.
Checketts, Benj., late Nantwich, Cheshire.
Chisnall, W. G., late Liverpool.
Chinn, W. J., late Gray's Inn Road.
Clark, Andrew, late Ballantree, Ayrshire.
Clark, John, late Auchenbowie, Stirling.
Clarke, W. S., late Great Waltham, Essex.
Clarkson, W., late A.V.D.
Constant, S. P., late A.V.D.
Cooper, John, late Manchester.
Cooper, John, late Walsall, Staffs.
Cotterell, James, late Lowestoft, Suffolk.
Crafts, H. W. L., late Fareham, Hants.
Crawford, W., late Glasgow.
Cresswell, H. B., late Manchester.
Crombie, James, late Dunfermline.
Crosby, John J., late Whitby, Yorks.
Cross, G. T., late Ipswich, Suffolk.
Cullimore, J. M., retired Indian Army.
Cunningham, Thos., late Dunedin, Otago, N.Z.
Day, F. W., late Tewkesbury.
Day, Walter, late Weymouth.
Dexter, Thos. P., late Chelsea, S.W.
Dickson, John, late West Graham Street, Glasgow.
Dickson, Thos., late West Graham Street, Glasgow.
Dobson, Robt., late Ticknall, Derby.
Donaldson, John, senr., late Paisley, Renfrewshire.
Douglas, John, late Denbigh, N. Wales.
Dow, James, late Knightsbridge, S.W.
Draper, Henry, late Ilkeston, Derby.
Easton, Alfred, late Chester.
Eastwood, Frank, late Preston.
Ebbetts, E. R., late Hanworth, Norfolk.
Edgar, Thos., late Dunlop, Ayrshire.
Edwards, Thos., late Wingham, Kent.
Elford, Robt., late Calne, Wilts.
Emms, C. W., late Sherborne, Dorsetshire.
Emms, H. G., late Norwich.
Evans, E. P., late Castleton, Cardiff.
Farmer, James, late Upper Kennington Lane, S.E.
Fawcett, Benj., late Morpeth, Northumberland.
Field, A. V., late Huddersfield.
Finlay, Geo. B., late Belfast.
Fitzgerald, James D., late Limerick.
Flavell, G. F., late Finchley, N.
Fleming, Wm., late Fountain Bridge, Edinburgh.
Flint, W., late Rotherham, Yorks.
Forbes, Peter, late Kidderminster.
France, John, late Birmingham.
Francis, J. J. A., late Smith Square, Chelsea.
Furnivall, John G., late Bayswater, W.
Garnett, Geo., late Regent's Park Road.
Gibson, Geo. Ed., late Hull, Yorks.
Giffen, Thos., late Belfast.
Gillingham, Geo., late Richmond, Surrey.
Glass, Robt., late Glasgow.
Gooch, C. A., late Indian Army.
Goodwyn, R., late Ipswich, Suffolk.
Gray, G., late Romford, Essex.
Green, C. S., late Shirland Road, Paddington.
Green, J. L., late Prestbury, Gloucester.
Green, Thos., late Manchester.
Gudgin, T. P., late A.V.D.
Hadfield, Thos., late Barnard Castle, Durham.
Hall, H., late Spilsby, Lincolnshire.
Harber, W. A., late Kidderminster.
Hardy, J., late Holland St., Blackfriars.
Hare, J. B. A., late Deerpark, Cashel, co. Tipperary.
Harrison, T., late A.V.D.
Hausmann, J. P. W., late Hanover.
Hawke, John A., late Cockermouth.
Hay, G. W., late Boswell's Green, Roxburgh.
Heatley, S. S., late Edinburgh.
Hewlitt, Ebenezer, late Bellock, Fermanagh.
Hill, Edwin, late Nottingham.
Hill, John H., late Brecon.
Hodgson, J. G., late Chingford.
Hoey, J. P., retired Indian Army.
Hogreve, H., junr., late A.V.D.
Holmes, R., late Birmingham.
Home, James, retired A.V.D.
Howard, Thos., late Mitcham.
Humphries, Geo., late Manchester.
James, Wm., late Tilbury Road, Brighton.
Jeeves, James, late Scarborough.
Jeffrey, Robt. T., late Camberwell.
Jennings, J. F., retired Indian Army.
Johnston, Geo., late A.V.D.
Jones, A. J., late Eccles, Manchester.
Jones, Thos., late Wrexham.
Joss, John, late Aberdeen.
Kay, Thos., late Ardwick Green, Manchester.
Kershaw, Andrew, late Spilsby, Lincolnshire.
Kidney, Geo., late Belfast.
Lamb, G. W., late Shipton, Yorks.
Langley, P. D., late Enfield.
Lawrenson, James, late Croston.
Leaney, A. G., late Whitehaven.
Learoyd, Edwd., late Edinburgh.
Legge, John, late Isle of Islay.
Llewellyn, W. H., late Regent St., City Road.
Lloyd, Thos. Edwd., junr., late Chester.
Loades, A. M., late Bishop Auckland, Durham.
Lovegrove, Charles, Llanwddyn, N. Wales.
McCaldon, late Croydon.
McCauley, Thos. M., late Belfast.
McHugh, John Thos., late Darwen, Lancs.
Mackenzie, Andrew, late Glasgow.
McKerrow, H., Lesmahagow, Lanark.
Maclay, Thos., late Glasgow.
McLaren, John, late Glasgow.
McNaughton, J., late Langholme, Dumfriess.
Maguire, Robt. John, late Pollockshields.
Mann, Andrew, junr., Thornley, Durham.
Marshall, Thos., late Coventry.
Martin, C. H., late Kingsland Crescent, N.E.
Martin, J. O., late Altrincham.
Martin, W., late A.V.D.
Martin, W. E., late Beaminster, Dorset.
Mason, Joseph, late Preston, Lancs.
Mathews, Robt. W., late Drogheda.
Mathewson, Geo., late Williamhope, Galashields.
Maxon, John, late Canterbury.
Miller, J. H., late Stroud, Gloucestershire.
Minikin, J. B., late Wexford, Ireland.
Moffatt, G. D., late Edinburgh.
Molyneux, Nathan, late Church St., Blackpool.
Moore, W. S., late Newcastle-on-Tyne.
Moorey, Jas., late Burton-on-Trent, Stafford.
Murray, W. C., late Portobello.
Muir, Robertson, late Dublin.
Neate, C. H. S., late Charing, near Ashford, Kent.
Neeve, T. W., late Woodbridge, Suffolk.
Norfolk. J. F., late Great Marlow, Bucks.
O'Conner, Jos., late Dublin.
Offer, Charles, Church end, Willesden.
Park, Robert, late Glasgow.
Phillips, Thos. W., late A.V.D.
Pickworth, H. W., Surbiton Hill, Surrey.
Pile, John, late Jersey.
Pollock, G. H. late Bridgeton, Glasgow.
Porteous, T. A., late Ferry Rd., Leith, Edinburgh.
Porter, Richd., Winchcombe, Gloucestershire.
Pratt, Thos., late Bolton Row, Piccadilly.
Pring, John, late Claverley, Bridgenorth, Salop.
Ramsden, Saml., late York.
Redmond, W., late Witney, Oxfordshire.
Redmond, W., late Charlestown, U.S.A.
Reeve, G., late Lewisham Road, Surrey.
Reid, Peter, late Falkirk, Stirlingshire.
Riddel, Joseph, late Abergeldie, Aberdeenshire.
Robertson, Andrew, late Glasgow.
Robertson, Thos., Beaminster.
Robertson, C. S., late Brentwood, Essex.

Robinson, John A., late Westgate, Peterborough.
Rogers, W., late Whitechapel Road, E.
Rogerson, John, late Clitheroe, Lanes.
Roughsedge, W. H., Cooper's Hill, St. Helen's, Lancs.
Rush, W., late Thaxted.
Rowland, J. T., late Sloane Street, Chelsea.
Ryan, W., Limerick.
Scott, W., Heath Street, Hampstead.
Selfe, H. E. C., Blackman Street, Borough.
Shade, James, late Glasgow.
Sheehy, J. F., late Limerick.
Shenton, Robt., Ashburne, Derbyshire.
Sherley, W. R., late Wimbledon Common.
Sherwood, Thos. G., Salisbury Street, Strand.
Sim, Hugh, late Chepstow, Monmouthshire.
Simpson, Wm., late Lancaster.
Sinclair, David, St. Austell, Cornwall.
Slack, J., late Lansdown Mews, Guildford St., W.C.
Smith, C. E., Hyde Street, Holborn.
Smith, David, late Forteviot, Perthshire.
Smith, F. A., late South Lincoln.
Smith, Gilberth, Closeburn, Dumfries.
Smith, John, late Yeovil.
Smith, John, late Barrow-in-Furness.
Smith, Kirtland, late South Lincoln.
Sorley, Fredk., late Windsor.
Sparrow, Geo. James, late Torquay.
Spence, Charles B., late Linton, Peebleshire.
Sperring, John Joseph, late Lichfield, Staffs.
Spicer, W., late Lambourne, Berks.
Staveley, W., late Highbury, N.
Stevens, Alfred, late Brighton.
Stevenson, W. J., late Dublin.
Stewart, Robt., late Brompton, S.W.
Sullivan, W. J., late Cork.
Sutton, Charles, lake York.
Tait, J., late Gweedmouth, Durham.
Talbott, H. C., late Bloomfield Road, Maida Hill.
Tate, J. N., late Sligo.
Taylor, W., late Edinburgh.
Taylor, W. E., late Market Harborough.
Teviotdale, John, late Elgin.
Thompson, J. C., late City Road.
Thompson, J. C,, late Londonderry.
Thomson, Joseph, late Boroughbridge.
Titterton, Charles, late Wimbledon, Surrey
Toll, W. P., late Burton-on-Trent, Staffs.
Turner, J. J., late Edinburgh.
Tyrell, John, late Dublin.
Turner, S. E., late Douglas, Isle of Man.
Tweedley, H., late Paisley Road, Glasgow.
Vyner, C. J., late Tuffnell Park, N.
Wall, F. A., late Warrington.
Wallis, W., late Charlestown, U.S.A.
Watkins, W. R., late Brynmaury, Tredegar.
Watlock, W., late Bath.
Watson, Geo., late Loftus in Cleveland, York.
Watt, Alex., late Edinburgh.
Western, Geo., late Indian Army.
Webb, H. P., late Nuneaton, Warwick.
Weighill, W. L., Marlow Road, Middlesbrough.
Weir, Robt., Isle of Coll, Ayrshire.
Whisken, E. C., Newton, Montgomeryshire.
White, F. S., late Barnstaple.
Whitecross, John W., late Edinburgh.
Whyttock, Alex., late Perth.
Wiggins, W., late Hatton Road, Islington.
Williams, J. J., late Camberwell, S.E.
Williams, John, late Spitalfields.
Wilmot, Robt., late Edinburgh.
Woolner, E. H., Heywood, Manchester.
Wilson, G., late Bank House, Edinburgh.
Wren, A. B., late Market Street, Stourbridge.
Wright, F., late Streatham, S.W.
Wyer, W., late Stroud, Gloucestershire.
Wyllie, G., late Slewoodfield, Aberdeen.
Young, A. T., late Kingerby.

MISCELLANEA.

NAVICULAR DISEASE.

Mr. Sydney Taylor is informed that this disease essentially consists of caries of the navicular bone, and is most frequently met with in horses which have done work. Horses which are suffering from the malady would doubtless transmit to their offspring a susceptibility to become affected. Thus far, navicular disease, like many other maladies, is to be viewed as hereditary.—Eds.

OBITUARY.

We much regret to have to record the death of Mr. John Vick, M.R.C.V.S., Gloucester, which took place January 7th, in the seventieth year of his age. Mr. Vick belonged to one of the oldest and most respectable families of the county, and few members have attained a higher estimation in public opinion. His diploma bears date May 24th, 1843.

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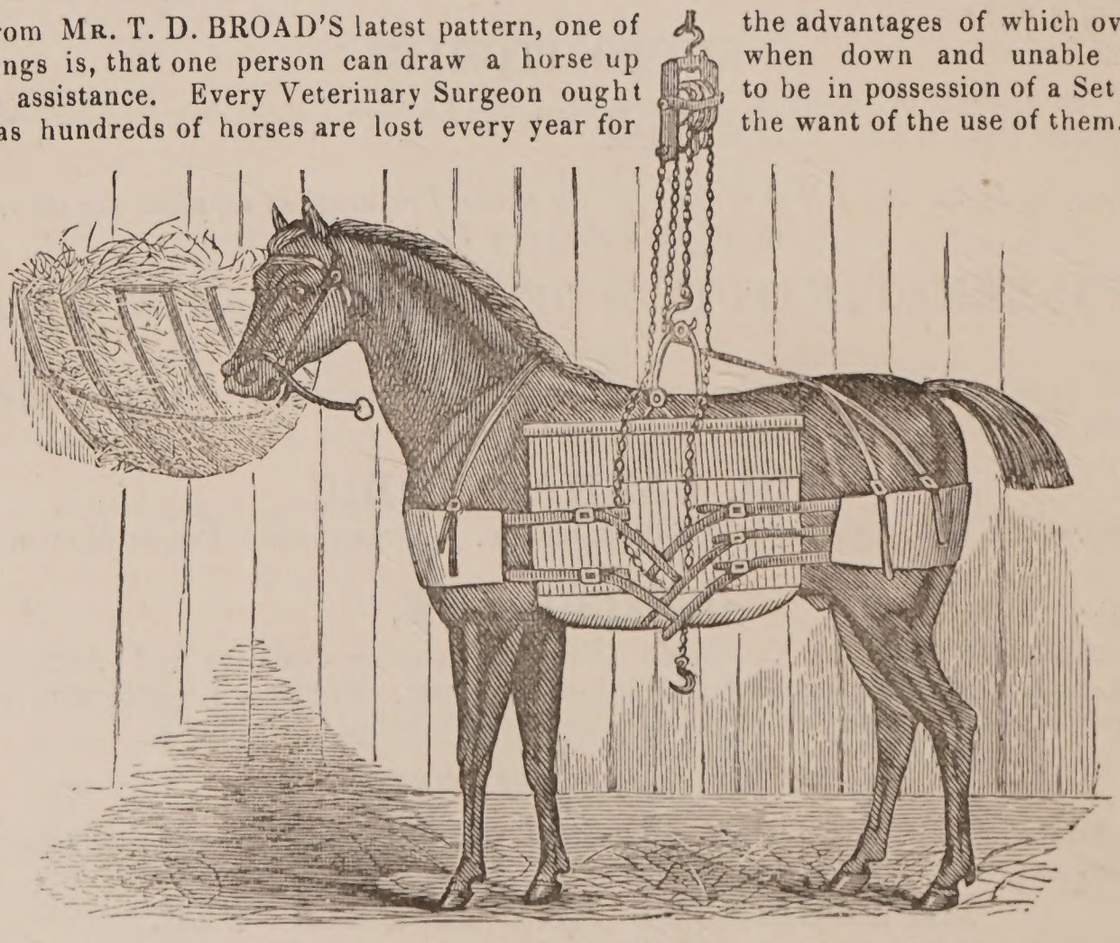

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George Dunbar Whatman, Esq.

TREASURER.—G. Dunbar Whatman, Esq.

PRINCIPAL.—Professor G. T. Brown, C.B.

A Subscription of *twenty guineas* entitles the Subscriber to all the privileges of the Institution, as a general Veterinary Establishment and Hospital for Animals, for life; and an annual payment of *two guineas*, to the same privileges during the continuance of such Subscription.

A Subscriber is entitled to have admitted into the Hospital for medical and surgical treatment, an unlimited number of Horses or other animals, his own property, at a charge only for their keep. Also, without the payment of fees, to have the opinion of the Professors as to the treatment of any animal he may wish to retain in his own establishment.

A Subscriber has likewise the privilege of having five horses examined *as to soundness* in the course of a year, and to receive the opinion of the Professors thereon, either verbally or in writing, free of charge; and also any further number at a fee of ten shillings and sixpence for each *extra* horse, or to have ten horses examined on payment, in addition to his Annual Subscription, of two guineas, or such other sum as shall from time to time be fixed by the Governing Body or General Purposes Committee.

The Professors do not examine horses for soundness out of the Institution, nor do they visit patients, except on very special occasions, and then only with the object of their being removed into the Hospital for treatment.

Members of the Royal Agricultural Society of England are entitled to all the privileges of Subscribers to the Institution, as appertaining to the diseases of Animals.

The Hospital and general Practice of the College is conducted by Professors Axe and Penberthy.

The Hospital contains ample accommodation for upwards of 100 Horses, besides Cattle, Sheep, Dogs, and other animals. It is fitted up with large and airy Loose-boxes and Stalls; Hot, Cold, Douche, and Vapour Baths; Operating Rooms, Covered Exercising Ground, &c. Rooms are specially set apart as an Infirmary for Dogs.

ROYAL VETERINARY COLLEGE.

By the Royal Charter of Incorporation the GOVERNORS have power "to confer upon and grant to such of the Students of the said College as they shall think fit, *Annual or other Exhibitions, Scholarships, Medals and other Prizes and Certificates of Distinction.*"

A SCHOLARSHIP of £25 per annum, tenable for two years, was awarded for the year ending June 30th, 1888; and an additional Scholarship of the same amount will be awarded in 1889. Beside the COLEMAN PRIZE MEDALS; CLASS MEDALS, PRIZES AND CERTIFICATES are given in each division of the Students' studies.

In addition to these Prizes the Royal Agricultural Society awards a *Silver* and a *Bronze Medal* to the two Students who may pass the best examination in the Pathology of Cattle, Sheep, and Pigs, at the Diploma Examination of the Royal College of Veterinary Surgeons

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The College Entrance Fee is 45 *Guineas;* the payment of which confers the right of attendance on *all* the Lectures and Collegiate Instructions. The fee may be paid in *three* instalments, viz., Twenty-five guineas on *entry*, Ten guineas at the end of the *first period* of study, and Ten guineas at the *second period* of study—the first instalment must, with the Matriculation Examination Fee of One guinea, as well as the Library and Reading Room Fee of One guinea, be paid prior to this Examination.

A Pupil, previously to his admission, is required to produce a recognised Certificate of Educational Acquirements, which must include all the pass subjects of the Matriculation Examination, or otherwise he must pass an Examination in *Writing, Reading aloud, Dictation, English Grammar, English History, Geography, Arithmetic, and French, German, or Latin.* A Pupil may also elect to be examined in any of the following subjects, *not exceeding two:*—Euclid, Books one and two; Algebra to Quadratic Equations inclusive; Natural History (Botany, Geology, or Zoology); Physiology; Chemistry; Physics; and the Greek, German, or Italian Languages.

The Educational Year is divided into a Summer and Winter Session of three terms, and begins on Oct. 1st and ends the middle of May.

Lectures, Clinical and Pathological, Demonstrations, and General Instruction, are given on Diseases of the Horse and other Domesticated Animals, including Epizöotics, Parasites and Parasitic Affections; also on Anatomy, Physiology, Histology, Chemistry (General and Practical), Materia Medica, Toxicology, Botany, Therapeutics and Pharmacy; Hospital Practice; Obstetrics; Operative Surgery, The Principles and Practice of Shoeing, &c.

Besides these Lectures and Demonstrations, the facilities which exist in the Institution are such as to enable Pupils, by attention to their duties, to acquire a well-grounded practical knowledge of their profession, and thus, on obtaining their Diploma, to at once merit the confidence of the public. This will become fully apparent when it is remembered that, for several past years, upwards of 2000 animals have been annually prescribed for and treated as GRATUITOUS PATIENTS *by the Pupils under the Supervision of the Teachers.*

In addition to the practical knowledge thus to be obtained, the pupils have the daily advantage of attending the Professors on their visits to the Patients in the Hospital, thereby becoming acquainted with the diagnosis and treatment of each individual case. Similar advantages are likewise enjoyed by them with reference to the Out-Patients. They also attend on the Professors in their Examinations of Horses for Soundness, the yearly average number of which exceeds 1000. It may be further added, as showing the advantage of the College for obtaining practical knowledge, that the number of animals admitted into the Hospital or treated as Out-Patients year by year exceeds 2000 or more than doubles those sent for examination as to soundness.

A Student, during his Academical Course, has to undergo *three* examinations by the Royal College of Veterinary Surgeons. To be eligible for the FIRST he is required to attend, *at least,* one Winter and one Summer Session; a second Winter and Summer Session before being eligible for the SECOND Examination, and a third Winter and Summer Session before being examined for the Diploma of the College.

The Examinations are held in May and December.

Educational Staff.

G. T. BROWN, C.B., Professor, Principal of the College and Lecturer on Contagious and Parasitic Diseases.
J. W. AXE, M.R.C.V.S., Professor of the Principles and Practice of Veterinary Medicine.
H. POWER, F.R.C.S., Professor of Physiology.
E. S. SHAVE, M.R.C.V.S., Professor of Anatomy.
J. PENBERTHY, F.R.C.V.S., Professor of Pathology and Therapeutics.
J. MACQUEEN, F.R.C.V.S., Professor of Botany and Histology.
J. BAYNE, Lecturer on Chemistry, Materia Medica, and Toxicology.
A. C. WILD, M.R.C.V.S., Demonstrator.
W. A. BYRNE, M.R.C.V.S., Hospital Surgeon.

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